

BRYOSTATIN SUBSTITUENTS

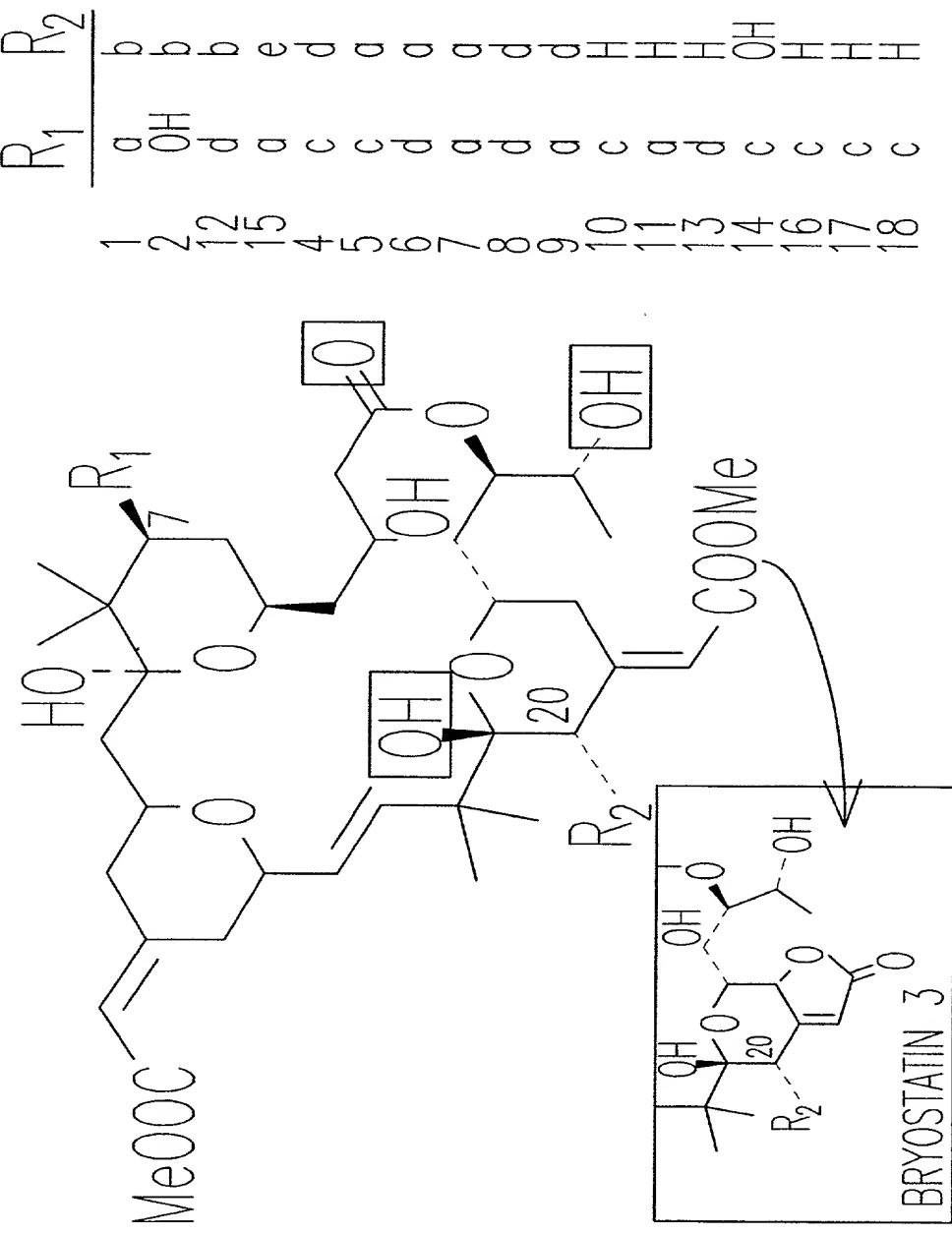


Fig. 1

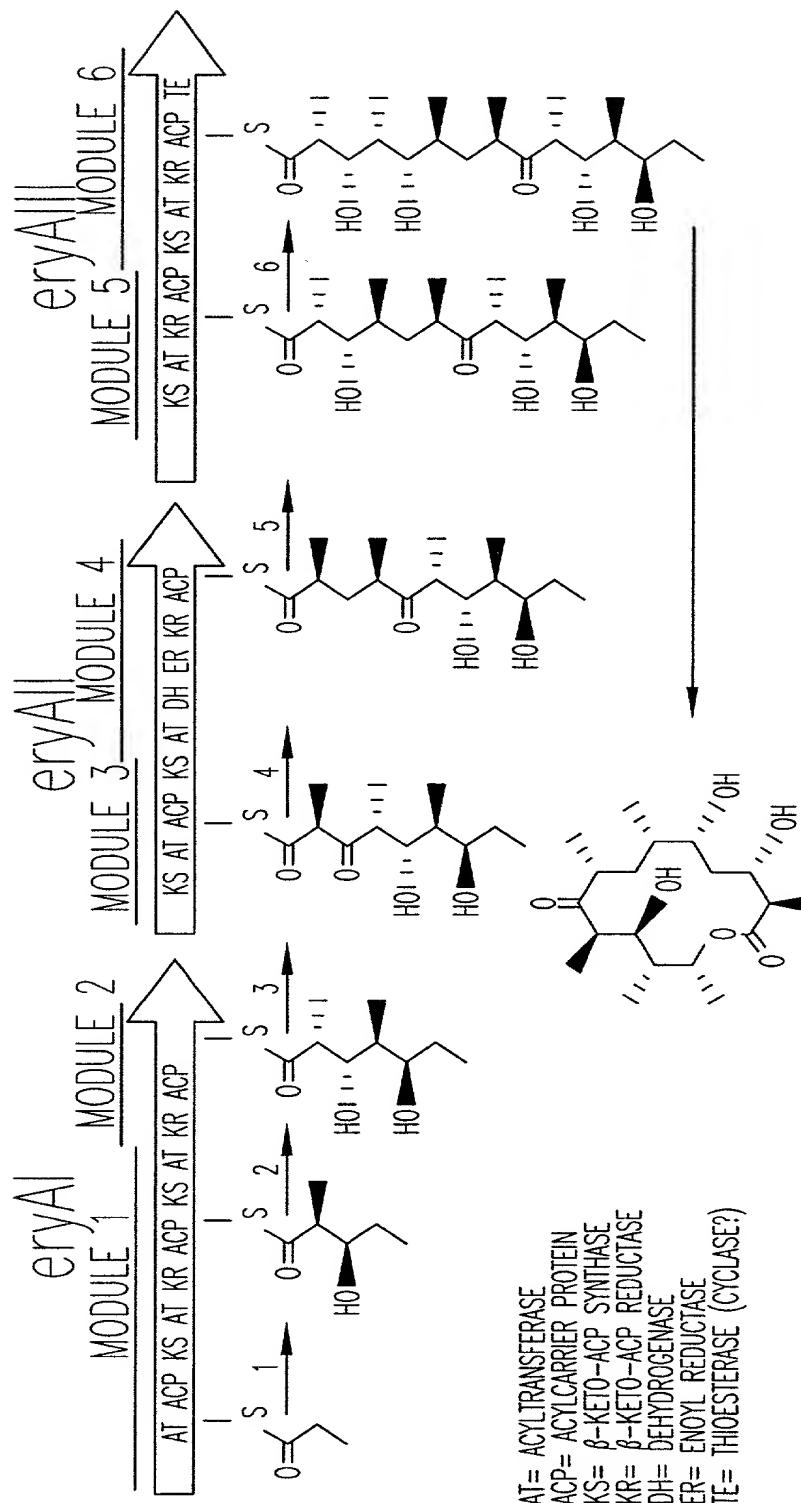


Fig. 2

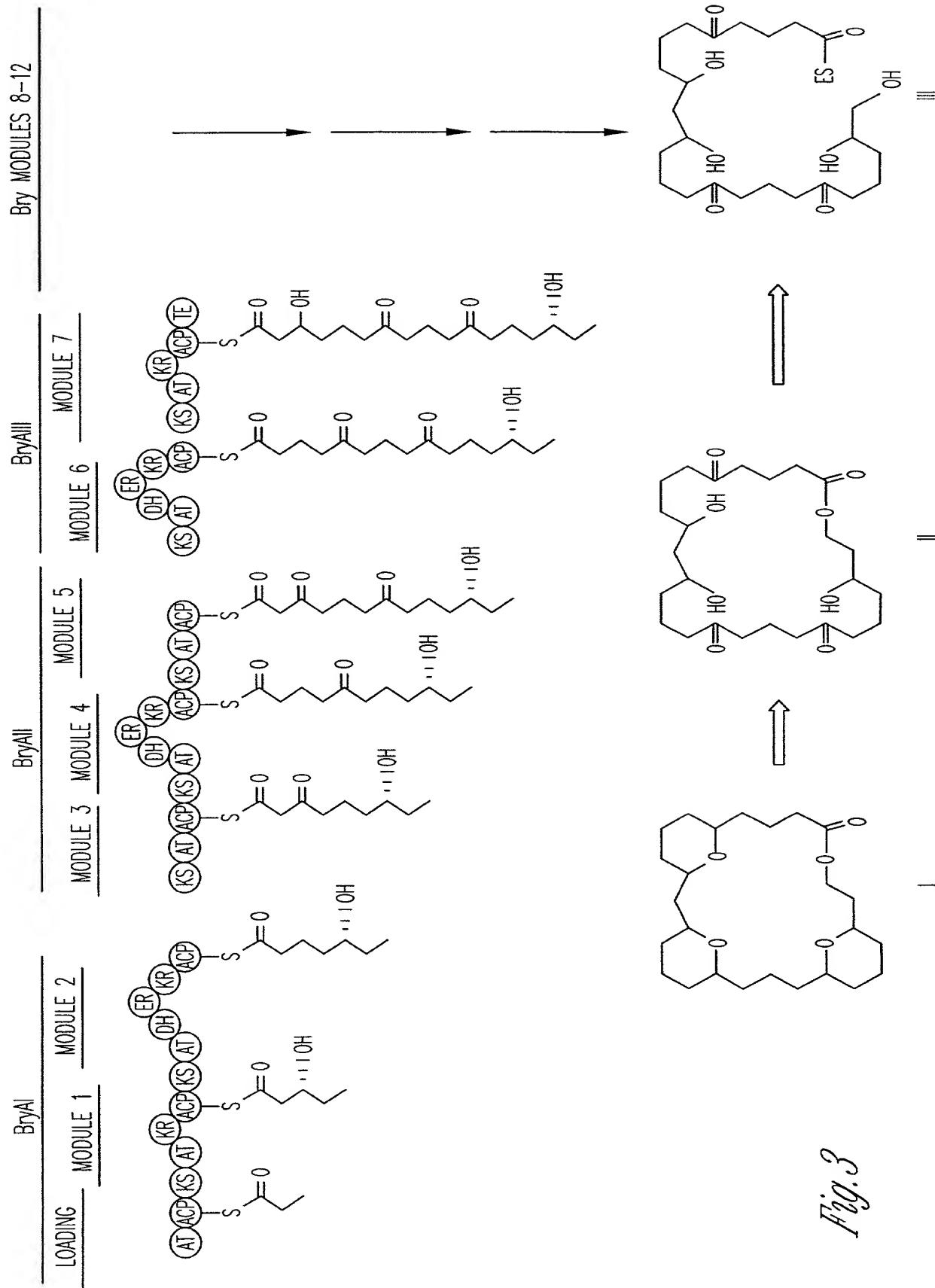


Fig. 3

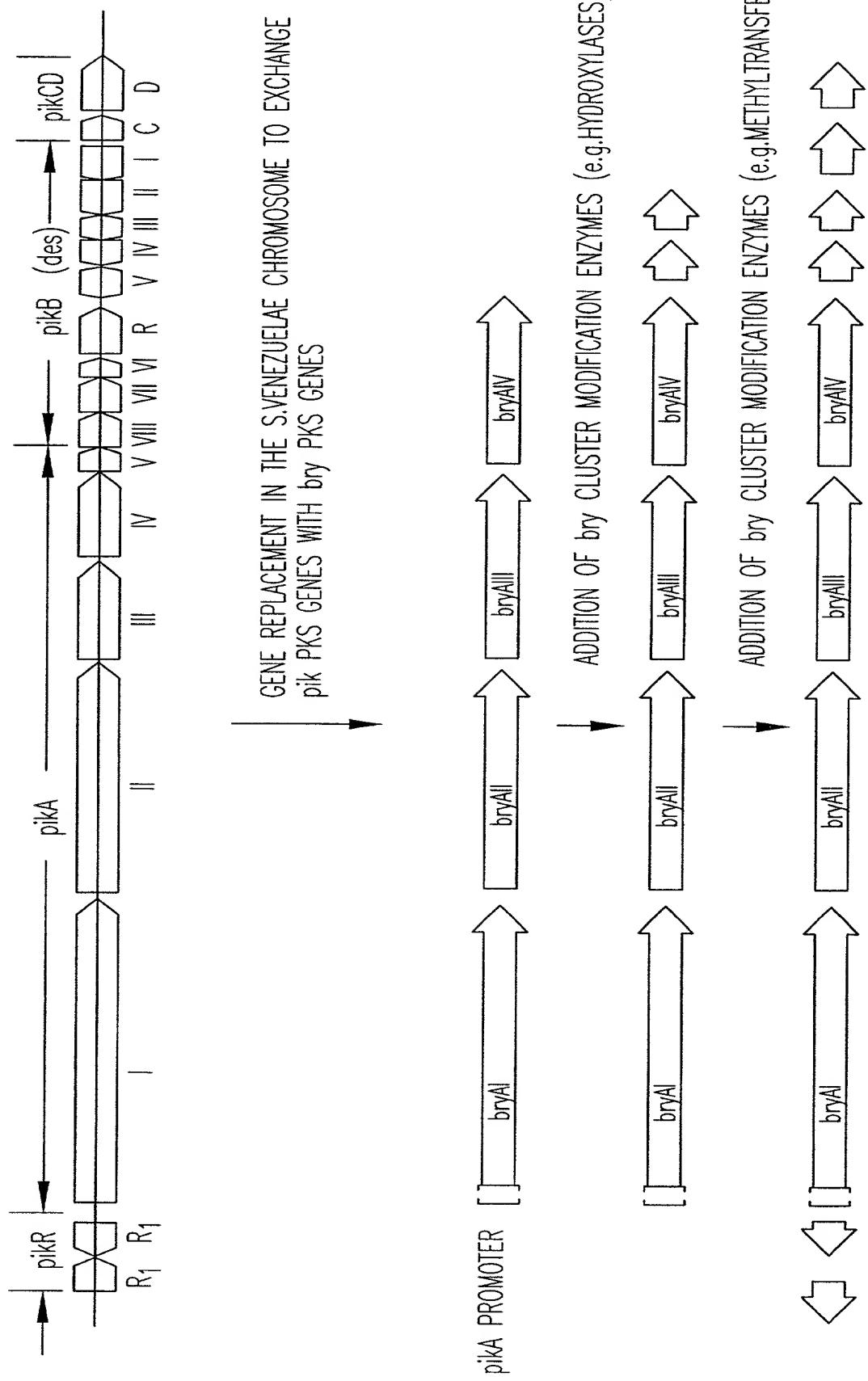


Fig. 4

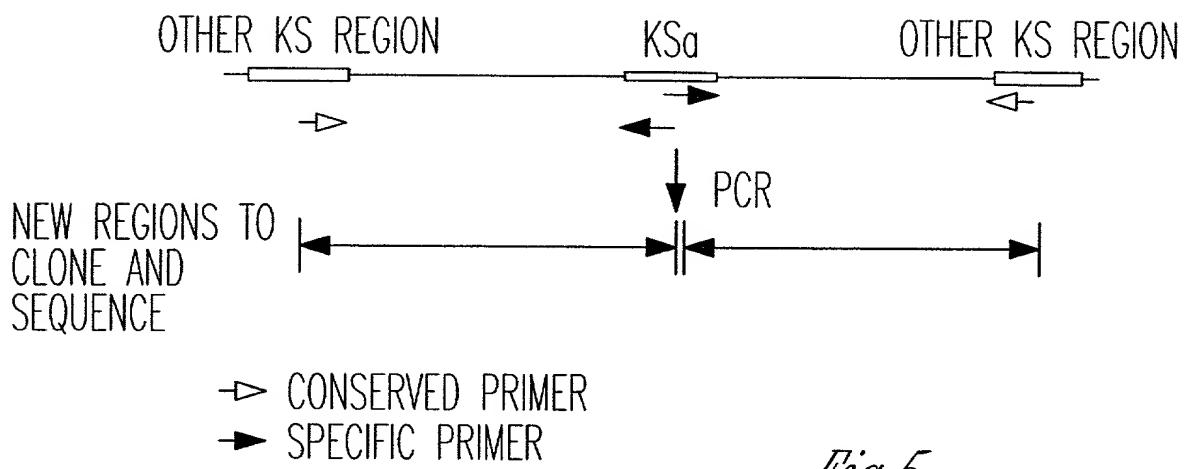


Fig. 5

6/110

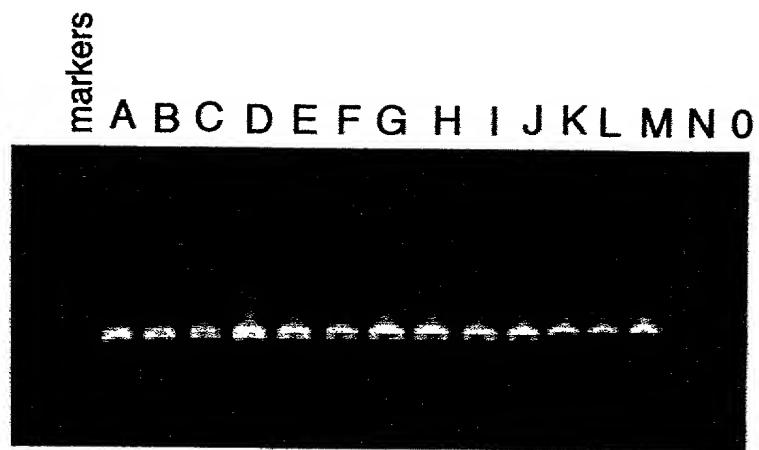


FIG. 6

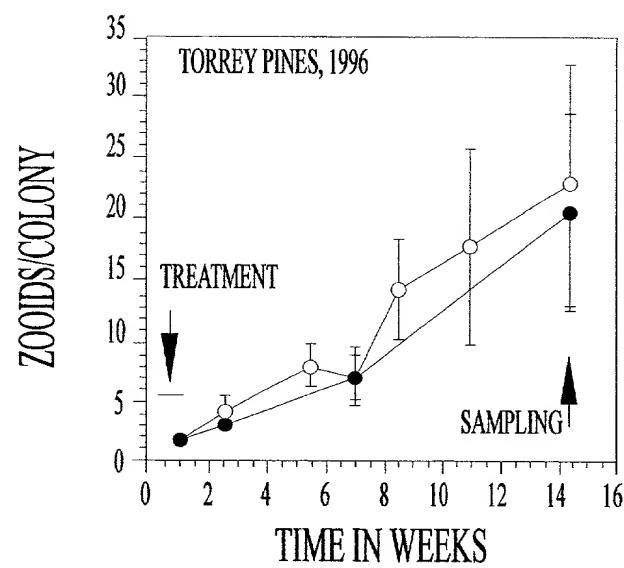


FIG. 7A

7/110

Control Treated



DGGE

Control Treated



KSa Amplification

FIG. 7B

FIG. 7C

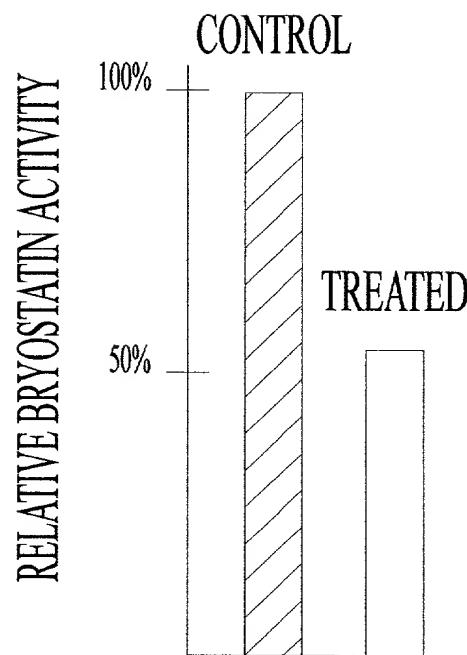


FIG. 7D

8/110

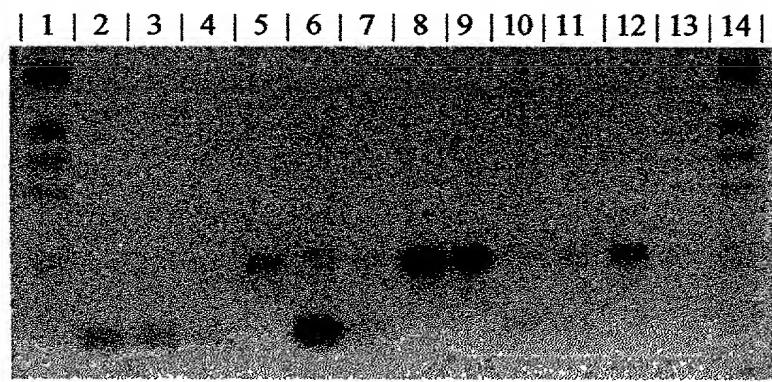


FIG. 8

9/110

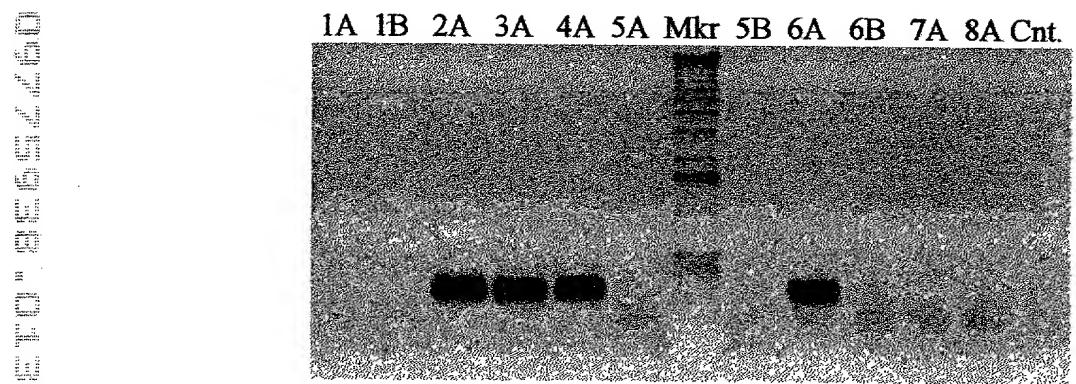


FIG. 9

10/110

2A 3A Mkr. 4A 6A

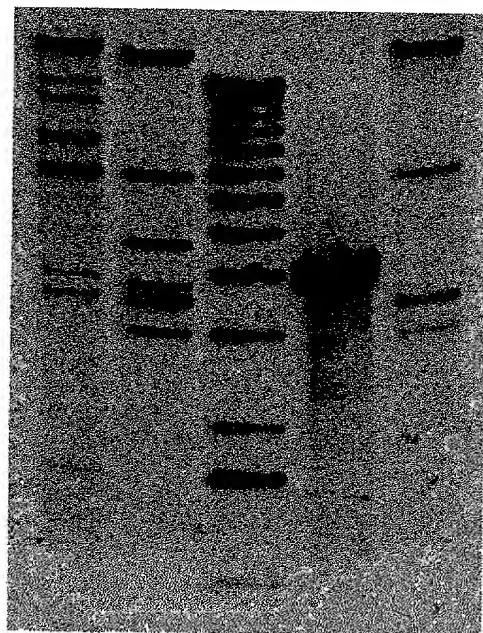


FIG. 10

11/110

5A 5B 3A 6A

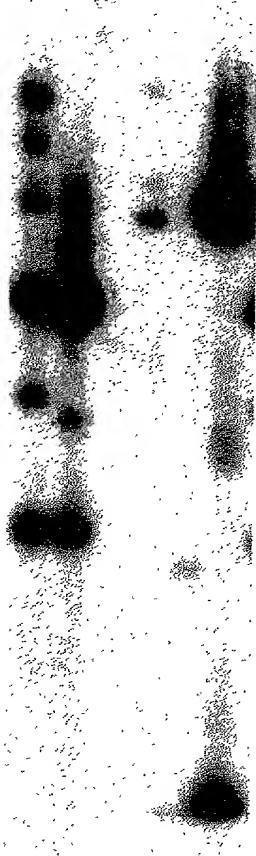


FIG. 11

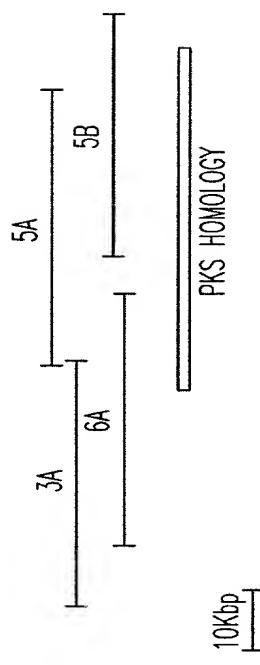


Fig. 12

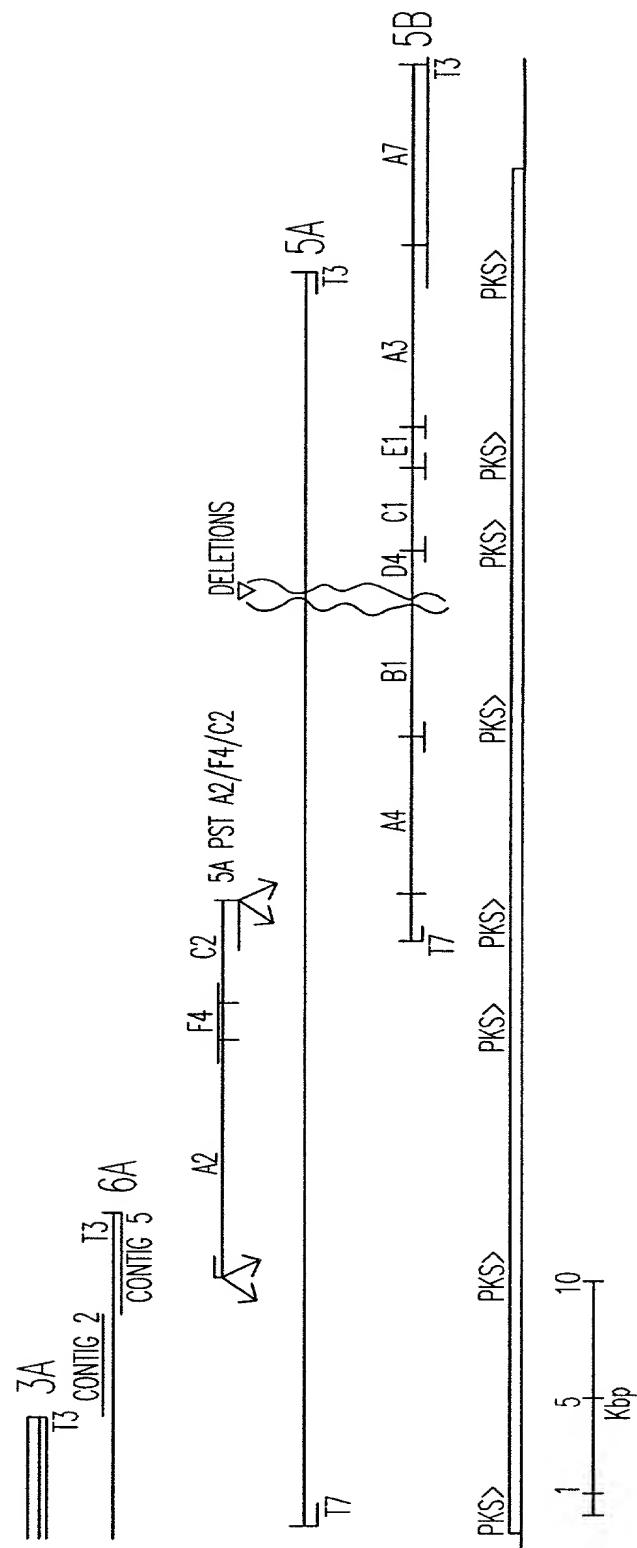


Fig. 13

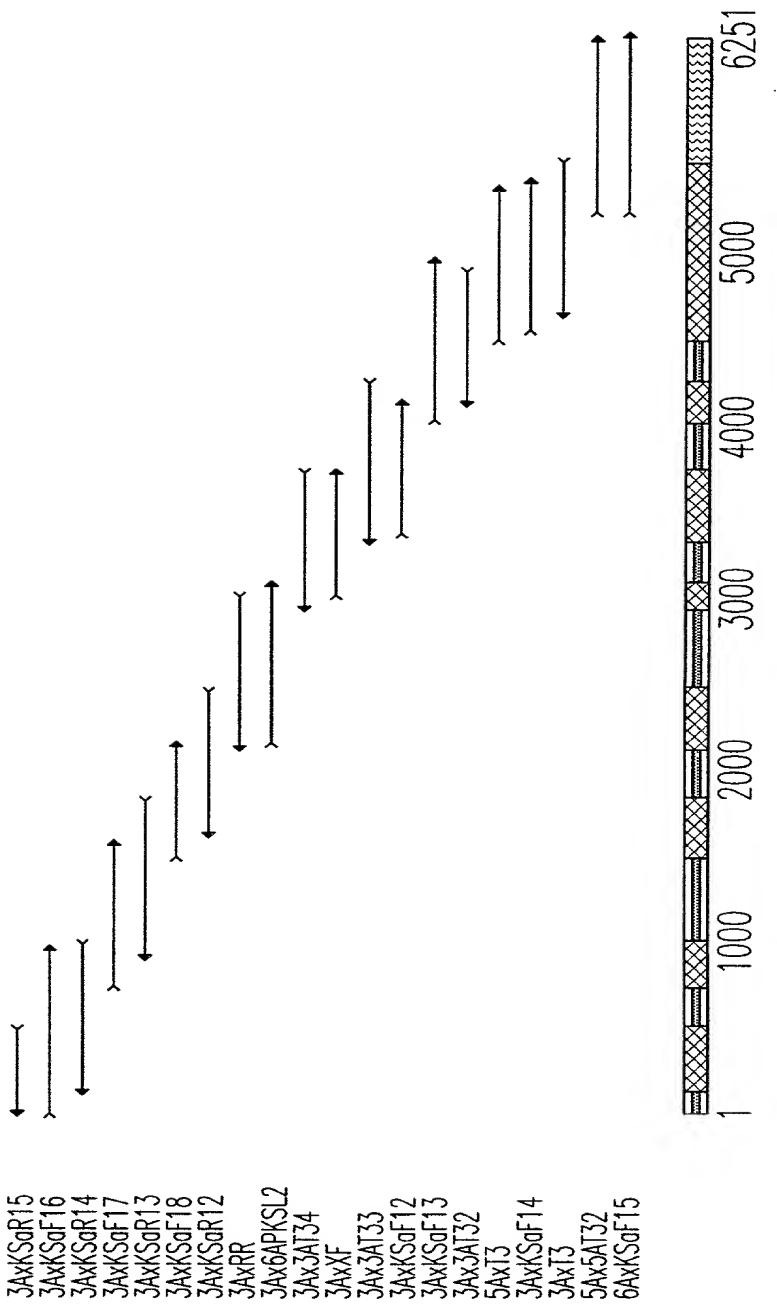


Fig. 14A

*Nucleotide and Translated Amino Acid Sequence of PKS Cluster on Clone 3A*

1	GAT	GGA	ACT	CAT	TAC	CAC	CCA	CAA	AAA	AGT	CCG	TTT	CTT	CAA	42
43	CGC	GGT	TGA	TTT	AAT	TAA	CCA	GCT	AAT	CAA	CGA	ACA	ACA	AAA	84
85	GCA	GCA	AAC	GGG	CAA	ACT	CAT	CAG	AGC	CTT	ATT	GCA	GGT	GGT	126
127	TG	TTG	TAG	TAT	TGA	TGA	ACT	CGG	TAA	TAT	CCC	ATT	CCC	TAA	168
169	ATC	CGG	TGG	GGC	GTT	GCT	CTT	CCA	CCT	CAT	CAG	TAA	ACG	GTA	210
211	TGA	GAA	GAC	CAG	TAT	TAT	CAT	CAG	CAC	CAA	TCT	GGC	TTT	TGG	252
253	GGA	ATG	GAA	CAG	TGT	GTT	TGG	TGA	TGC	CAA	GAT	GAC	CAC	CGC	294
295	GTT	ATT	GGA	TCG	TAT	CAC	GCA	TCA	TTG	TTC	AAT	CAT	CGA	AAC	336
337	CAA	GCA	TGC	GTC	GTA	TCG	TTT	TAA	GCA	GAG	TCA	GAA	ACA	GAC	378

379 ATG AAA GTA GCT TTC ACC GGT GGG ACA GTG TTA GAT GCA AAC 420  
 <<<TRANSPOASE ORF

421 CCC GGG TCA GCT TTA AGT GCA ATT TGA ATA CCA ATG TGA TAA 462  
 Possible transcription control sequences> -35 -10

463 TTG TGG CTA AGA TCA ATA AAA ATA TAA TTT TAT TGA TTA 504  
 Inverted repeat> -----> -----> -----> -----> ----->

505 TGA TGA TCC ACG TTA AAA AAA ATA CTA TAA ATA TGA ATT AAT 546

547 ATT TCA ACT TTA TTT TTG ATG GTC GTT GAG GAA TTT TTT 588  
 PKS ORF START>>> M V V V E E F F  
 Possible SD sequence

589 GTG AGT TAT CGA GAT ATT TTG AAG GCT TTA CAG GAT GAA AAA 630  
 V S Y R D I L K A L Q D E K

631 ATT AGT TTT GAA GAG GCT AAA TAT AAG TTA ATA AAA AGA AAA 672  
 I S F E E A K Y K L I K R K

673 GAT AAA AAA TCA AAA CAG CGT TTA AAT CAT GAT CGT GAA TTA 714  
 D K K S K Q R L N H D R E L

FIG 14B (cont'd)

T G T E T C G G E G C C G

715	AAT	CGA	TCG	ATG	AAT	ATT	ACG	CCA	AAA	ATA	GTG	AAT	AAT	TAC	756
	N	R	S	M	N	I	T	P	K	I	V	N	N	Y	
757	GGT	TTA	GTA	TTA	TTG	GGC	GGT	CAT	TTA	TTT	GAA	GAA	CTC	CGT	798
	G	L	V	L	L	G	G	H	L	F	E	E	L	R	
799	CTG	AGT	GAA	TGG	AAA	GCT	GCC	AAC	CCT	AAC	CCT	AAT	GAA	GTT	840
	L	S	E	W	K	A	A	N	P	N	P	N	E	V	
841	AGC	ATT	CAG	GTC	AAG	GCA	TCC	GCC	ATT	AGT	TTT	ACC	GAT	ACC	882
	S	I	Q	V	K	A	S	A	I	S	F	T	D	T	
883	TTG	TGT	GTA	CAA	GGT	TTA	TAT	CCA	TCA	CAC	TAT	CCC	TTT	GTT	924
	L	C	V	Q	G	L	Y	P	S	H	Y	P	F	V	
925	CCG	GGC	TTT	GAA	GTA	TCG	GGA	GTG	ATT	CGT	CAA	GTG	GGT	GAA	966
	P	G	F	E	V	S	G	V	I	R	Q	V	G	E	
967	CAC	ATA	ACC	GAC	TTA	CAC	GTG	GGT	GAT	GAA	GTT	ATT	GCG	TTC	1008
	H	I	T	D	L	H	V	G	D	E	V	I	A	F	
1009	ACA	GGA	TCA	TCA	ATG	GGA	GGG	CAT	GCT	GCC	TAT	GTG	ACG	GTG	1050
	T	G	S	S	M	G	G	H	A	A	Y	V	T	V	
1051	CCA	CAA	GAT	TAC	GTG	GTG	CGA	AAA	CCC	AAG	GAC	TTA	TCT	TTT	1092
	P	Q	D	Y	V	V	R	K	P	K	D	L	S	F	

FIG 14B (cont'd)

卷之三

1093	GAG	GAT	GCC	TGT	AGC	TTC	CCA	TTG	GCT	TTT	GCG	ACC	GTC	TAT	TAT	1134
	E	D	A	C	S	F	P	L	A	F	A	T	V	Y		
1135	CAC	AGT	TTT	GCA	CGG	GGA	AAA	TTA	TCT	CAC	AAC	GAT	CAT	ATC	ATC	1176
	H	S	F	A	R	G	K	L	S	H	N	D	H	I		
1177	TTG	ATA	CAA	ACG	GCG	ACA	GGT	GGC	TGT	GGT	TTG	ATG	GCA	CTT	CTT	1218
	L	I	Q	T	A	T	G	G	C	G	L	M	A	L		
1219	CAG	TTG	GCG	CGT	TTA	AAG	CAG	TGT	GTG	TGT	TAT	GGG	ACC	TCC	TCC	1260
	Q	L	A	R	L	K	Q	C	V	C	Y	G	T	S		
1261	AGC	CGA	GAA	GAC	AAG	CTT	GCA	CTC	CTC	AAA	CAG	TGG	GCA	CTG	CTG	1302
	S	R	E	D	K	L	A	L	L	K	Q	W	A	L		
1303	CCC	TAC	GTC	TTC	AAT	TAT	AAG	ACG	TGC	AAT	ATT	GAT	GAG	GAG	GAG	1344
	P	Y	V	F	N	Y	K	T	C	N	I	D	E	E		
1345	ATT	CAA	CGC	GTC	AGT	GGT	CAT	CGA	GGT	GAT	GTC	GTC	TTA	TTA	1386	
	I	Q	R	V	S	G	H	R	G	V	D	V	V	L		
1387	AAT	ATG	CTC	CCA	GGA	GAG	CAT	ATA	CAA	CAA	GGG	CTG	AAT	AGT	AGT	1428
	N	M	L	P	G	E	H	I	Q	Q	G	L	N	S		
1429	TTA	GCC	AAG	GGA	GGC	CGT	TAT	TTG	GAA	CTG	TCG	ATG	CAT	GGA	GGA	1470
	L	A	K	G	G	R	Y	L	E	L	S	M	H	G		

FIG 14B (cont'd)

1471	TTG	TTA	ACG	AAC	GAA	CCT	GTC	AGT	CTG	TCT	CTG	CGT	TTT
	L	L	T	N	E	P	V	S	L	S	S	L	R
1513	AAT	CAA	TCC	GTT	CAA	ACC	ATC	AAT	TTA	CTG	GGG	TTA	CTC
	N	Q	S	V	Q	T	I	N	L	L	G	L	N
1555	AAG	GGT	GAT	GAT	GGC	TTT	ATC	GGG	TCT	GTA	TTA	GCG	CAA
	K	G	D	D	G	F	I	F	S	V	L	A	Q
1597	GTT	TCC	TGG	ATT	GAA	TCA	GGT	GAT	TTA	GTG	TCA	ACC	GTG
	V	S	W	I	E	S	G	D	L	V	S	T	V
1639	CGT	ATT	TAT	CCG	TTG	GAT	CAG	ATC	GGT	GAA	GCG	TTA	CGT
	R	I	Y	P	L	D	Q	I	G	E	A	L	R
1681	GTC	TCT	GAA	GGG	GAG	CAT	ATA	GGT	AAA	GTC	GTT	GTG	AGT
	V	S	E	G	E	H	I	G	K	V	V	S	H
1723	ACA	GCG	ACA	GAG	CCG	ATG	TGC	AGA	CAG	CGC	TGT	ATT	GAC
	T	A	T	E	P	M	D	C	R	Q	R	C	I
1765	AAT	GTA	TTG	AAG	CAA	GGG	CAA	ATG	GCG	GCC	TTG	ACC	GCG
	N	V	L	K	Q	G	Q	M	A	A	L	T	A
1807	GGG	GGA	AAA	AGC	CGG	GTG	TGG	GGT	GGT	ACT	GGT	GTC	AAT
	G	G	K	S	R	V	W	G	G	T	G	V	N

FIG 14B (cont'd)

1849	AAA	CCG	TCT	CCT	GCT	GTT	GGT	ATA	GAG	GAG	CGT	TTA	TTG	GAA	1890
	K	P	S	P	A	V	G	I	E	E	R	L	L	E	
1891	GGG	ATA	GCG	GTC	ATT	GGT	CTG	TCA	GGC	CAG	TAT	CCG	AAG	TCG	1932
	G	I	A	V	I	G	L	S	G	Q	Y	P	K	S	
1933	AAG	ACA	CTG	GAG	CAA	TTT	TGG	CAG	ACC	CTA	GCG	GAT	GGA	GTG	1974
	K	T	L	E	Q	F	W	Q	T	L	A	D	G	V	
1975	GAT	TGC	ATC	TCA	GAG	ATT	CCT	GCT	GAT	CGC	TGG	TCG	TTA	GAA	2016
	D	C	I	S	E	I	P	A	D	R	W	S	L	E	
2017	GAG	TAT	TAC	TCG	CCA	ATA	CCG	GAA	GGG	GGT	AAA	ACG	TAT	TGT	2058
	E	Y	Y	S	P	I	P	E	G	G	K	T	Y	C	
2059	AAG	TGG	ATG	GGT	GTT	TGG	GAG	GAC	ATG	GAT	TGT	TTT	GAT	CCG	2100
	K	W	M	G	V	L	E	D	M	D	C	F	D	P	
2101	TTG	TTT	TTT	GCG	ATA	TCT	CCT	CGG	GAA	GCG	GAA	GTG	ATG	GAC	2142
	L	F	F	A	I	S	P	R	E	A	E	V	M	D	
2143	CCA	CAG	CAA	CGG	TTA	TTT	TTA	GAG	AAT	GCA	TGG	AGT	TGT	ATA	2184
	P	Q	Q	R	L	F	L	E	N	A	W	S	C	I	
2185	GAG	GAT	GCG	GGG	ATT	AAC	CCT	AAG	ATG	TTA	TCC	CGT	AGT	CGA	2226
	E	D	A	G	I	N	P	K	M	L	S	R	S	R	

FIG 14B (cont'd)

2227	TGT	GGG	GTA	TTT	GTC	GGG	TGC	GGT	GCG	AAT	GAT	TAC	AGC	GCT	2268
	C	G	V	F	V	G	C	G	A	N	D	Y	S	A	
2269	CTA	ATG	AAC	AGT	AGC	CAC	TCA	ACG	AGT	CTC	GAA	TTA	ATG	AAG	2310
	L	M	N	S	S	H	S	T	S	L	E	L	M	K	
2311	GAA	TTA	GGC	AAC	AAC	TCT	TCC	ATT	TTA	TCT	GCA	CGA	ATC	TCC	2352
	E	L	G	N	N	S	S	I	L	S	A	R	I	S	
2353	TAC	TTT	TTA	AAT	TTA	AAG	GGC	CCT	TGT	CIT	GCG	ATT	GAT	ACC	2394
	Y	F	L	N	L	K	G	P	C	L	A	I	D	T	
2395	GCA	TGT	TCT	TCA	TTA	GTG	GCC	ATT	GCC	GAG	TCG	TGT	AAT	2436	
	A	C	S	S	L	V	A	I	A	E	S	C	N		
2437	AGT	CTG	GTG	TTG	GGT	ACT	AGT	GAC	TTG	GCG	TTG	GCA	GGT	GGA	2478
	S	L	V	L	G	T	S	D	L	A	L	A	G	G	
2479	GTG	TTG	CTG	ATG	CCA	GGT	CCA	TCC	TTA	CAT	ATA	GGT	TTG	AGT	2520
	V	L	L	M	P	G	P	S	L	H	I	G	L	S	
2521	CAT	GGA	GAA	ATG	TTA	TCA	GTA	GAT	GGT	CGC	TGC	TTT	ACC	TTT	2562
	H	G	E	M	L	S	V	D	G	R	C	F	T	F	
2563	GAC	CAA	CGG	GCC	AAC	GGT	TTT	GTA	CCT	GGA	GAG	GGT	GTC	GGC	2604
	D	Q	R	A	N	G	F	V	P	G	E	G	V	G	

FIG 14B (cont'd)

2605	GTT	GTC	TTG	TTA	AAA	CGC	ATG	TCG	GAT	GCG	GTG	CGT	GAT	GGT	2646
	V	V	L	L	K	R	M	S	D	A	V	R	D	G	
2647	GAT	CCC	ATT	CGT	GCA	GTG	ATA	CGG	GGC	TGG	GGT	GTG	AAT	CAG	2688
	D	P	I	R	A	V	I	R	G	W	G	V	N	Q	
2689	GAT	GGT	AGA	AGT	AAT	GGT	ATT	ACG	GGG	CCG	AGT	TCA	AAA	GCG	2730
	D	G	R	S	N	G	I	T	A	P	S	S	K	A	
2731	CAA	AGT	GCT	CTG	GAG	CAA	GAG	GTT	TAT	CAA	CGT	TTT	AAT	ATT	2772
	Q	S	A	L	E	Q	E	V	Y	Q	R	F	N	I	
2773	GAT	CCA	TCG	AGC	ATT	ACC	TTA	GTC	GAA	GCA	CAC	GGA	ACG	GGC	2814
	D	P	S	S	I	T	L	V	E	A	H	G	T	G	
2815	ACC	AAA	TTG	GGT	GAT	CCG	ATA	GAA	GTC	GAG	GCA	TTG	GCA	GAA	2856
	T	K	L	G	D	P	I	E	V	E	A	L	A	E	
2857	TCG	TTT	CGA	GTC	TAT	ACG	GAC	AAG	CGT	CAT	TAC	TGT	GCT	CTG	2898
	S	F	R	V	Y	T	D	K	R	H	Y	C	A	L	
2899	GGG	TCG	GTA	AAA	AGT	ATT	GGT	CAT	TIG	GGG	GTA	GGT	GCT	CTG	2940
	G	S	V	K	S	N	I	G	H	L	G	V	G	A	
2941	GGG	ATA	GCG	GGC	GTG	ACC	AAA	GTA	TTG	TIA	TCT	TTG	CAG	CAT	2982
	G	I	A	G	V	T	K	V	L	L	S	L	Q	H	

FIG 14B (cont'd)

2983	CGC	ATG	TTA	CCA	CCG	ACG	ATT	CAT	TGT	GAG	GAT	GTA	AAC	CCA	3024
	R	M	L	P	P	T	I	H	C	E	D	V	N	P	
3025	CAG	ATT	GCG	TTG	GAA	GGT	AGC	CCC	TTT	TAT	ATC	AAT	ACG	GAA	3066
	Q	I	A	L	E	G	S	P	F	Y	I	N	T	E	
3067	TTA	AAG	CCT	TGG	CAG	TCT	GGT	GAC	AGT	ATA	CCA	CGA	CGG	GCT	3108
	L	K	P	W	Q	S	G	D	S	I	P	R	R	A	
3109	GGT	GTC	AGT	TCT	TTT	GGA	TTT	AGT	GGT	ACC	AAT	GCA	CAT	CTT	3150
	G	V	S	S	F	G	F	S	G	T	N	A	H	L	
3151	GTA	TTG	GAG	GAA	TAT	CTT	CCT	CAC	TCG	ACA	GGA	ACA	ATA	GAG	3192
	V	L	E	E	Y	L	P	H	S	T	G	T	I	E	
3193	TCG	TTT	GCT	GCG	AAT	CAT	GCA	AGT	ACA	GTT	ATT	ATT	CCT	TTG	3234
	S	F	A	A	N	H	A	S	T	V	I	I	P	L	
3235	TCA	GCG	AAA	AGT	CAT	AAT	AGT	TTA	TAC	ACA	TAT	GCT	CAA	ACG	3276
	S	A	K	S	H	N	S	L	Y	T	Y	A	Q	T	
3277	CTA	TTG	ATA	TTT	TTA	AAA	CGT	AGT	CAG	GTT	ACT	GAC	GCT	AAA	3318
	L	L	I	F	L	K	R	S	Q	V	T	D	A	K	
3319	AAA	ATC	ACA	ATA	GAT	CAC	ATG	GAA	TGT	CGC	TTG	TTG	GAT	TTA	3360
	K	I	T	I	D	H	M	E	C	R	L	L	D	L	

FIG 14B (cont'd)

3361	GCC	TAT	ACT	TTG	CAA	GTG	GGT	CGC	GAG	GCA	ATG	GAC	AAA	CGG	3402
	A	Y	T	L	Q	V	G	R	E	A	M	D	K	R	
3403	ATA	AGT	TTT	ATT	GTC	AAC	ACA	AAG	CAA	GCA	CTC	GTG	GAA	AAG	3444
	I	S	F	I	V	N	T	K	Q	A	L	V	E	K	
3445	CTA	AAT	GCT	TTT	CTA	GAG	AAG	GAA	AAG	ACT	ATA	ACA	GAC	TGT	3486
	L	N	A	F	L	E	K	E	K	T	I	T	D	C	
3487	TAC	CAC	TAT	TTA	TTT	GAT	AGT	GAC	AAA	CCG	TCT	ACA	GAA	ATT	3528
	Y	H	Y	L	F	D	S	D	K	P	S	T	E	I	
3529	TTC	CGT	TTA	GAC	GAA	GAT	GAC	AAA	GTA	TIA	ATA	AAC	AGC	TGG	3570
	F	R	L	D	E	D	D	K	V	L	I	N	S	W	
3571	ATA	AGT	CAA	AGT	CAA	TAT	CAC	AAA	TTA	GCC	GAA	GCC	TGG	AGC	3612
	I	S	Q	S	Q	Y	H	K	L	A	E	A	W	S	
3613	CAA	GGA	CTC	GAT	ATC	GAC	TGG	ACG	CTA	CTC	TAT	ACC	CAC	TCA	3654
	Q	G	L	D	I	D	W	T	L	L	Y	T	H	S	
3655	TCA	ACC	CCT	CGT	CGC	ATT	AGC	CTG	CCC	ACG	TAT	CCC	TTT	GCC	3696
	S	T	P	R	R	I	S	L	P	T	Y	P	F	A	
3697	AGA	GAC	CGC	TAC	TGG	CTA	CCA	GAA	AAA	CCA	CGC	TAT	AAC	GCG	3738
	R	D	R	Y	W	L	P	E	K	P	R	Y	N	A	

FIG 14B (cont'd)

W G T E E D " E E G G G G G D

3739	GCT	AAT	CAT	CCG	GTA	TCC	AAC	CAT	CAA	ACA	ACC	ACT	CAG	AAT	3780
	A	N	H	P	V	S	N	H	Q	T	T	T	Q	N	
3781	CAC	TCA	CGC	TTT	GCC	ATT	GAT	ACG	GAT	CAC	GAT	GTC	GTT	GCC	3822
	H	S	R	F	A	I	D	T	D	H	D	V	V	A	
3823	GAG	ATC	ATG	CAA	AAG	ACA	CAT	CAA	CAG	GAA	CTG	GAA	CAA	TGG	3864
	E	I	M	Q	K	T	H	Q	Q	E	L	E	Q	W	
3865	TTA	TTA	AAA	CTG	TTG	TTT	GTG	CAA	TTG	CAA	CAT	ATG	GCA	TTA	3906
	L	L	K	L	L	F	V	Q	L	Q	H	M	G	L	
3907	TTT	CAA	CAT	CGT	GTC	TTT	GAG	ACA	GCG	ACC	GCT	CTA	CGT	CAA	3948
	F	Q	H	R	V	F	E	T	A	T	A	L	R	Q	
3949	AGT	GCA	GGC	ATC	GTT	GAT	AAA	TAT	GAT	CGC	TGG	TGG	CAT	GAG	3990
	S	A	G	I	V	D	K	Y	D	R	W	W	H	E	
3991	TGT	TTA	AGC	GTT	TTA	CAG	GAT	GCG	GGT	TAT	CTT	GAA	TGG	AAA	4032
	C	L	S	V	L	Q	D	A	G	Y	L	E	W	K	
4033	GAC	GAT	AGC	GTA	GCC	GCC	GCA	CAG	GCA	TTG	GAG	TCT	GAA	TCG	4074
	D	D	S	V	A	A	A	Q	A	L	E	S	E	S	
4075	CAA	GAG	GCA	TGG	TGG	AGC	CGA	TGG	AAC	ACG	GAG	TAT	AAG	CAT	4116
	Q	E	A	W	W	S	R	W	N	T	E	Y	K	H	

FIG 14B (cont'd)

4117	TAC	CAG	AAT	GAT	CCG	GAA	AAA	AAG	ACG	TAA	GCG	ATA	TTG	ATT	4158
	Y	Q	N	D	P	E	K	K	T	L	A	I	L	I	
4159	AAC	GAT	TGC	TTA	CAG	GCA	TAA	CCA	GGG	GTG	TAA	AGT	GGT	GAG	4200
	N	D	C	L	Q	A	L	P	G	V	L	S	G	E	
4201	CAA	TTA	ATA	ACG	GAT	ATT	ATT	TTC	CCC	AAT	GGT	TCG	ATG	GAG	4242
	Q	L	I	T	D	I	I	F	P	N	G	S	M	E	
4243	AAA	ATG	GAA	GGC	TTA	TAT	AAA	AAT	AAT	AGG	ATT	GCA	GAT	TAT	4284
	K	M	E	G	L	Y	K	N	N	R	I	A	D	Y	
4285	TGT	AAT	CAG	TGT	GTT	GGA	GAC	CTG	CTC	GTC	CAG	TTT	ATT	GAA	4326
	C	N	Q	C	V	G	D	L	L	V	Q	F	I	E	
4327	GCA	CGT	CTG	TCA	AGA	GAT	GCC	AAT	GCG	AGG	ATA	CGG	ATT	ATC	4368
	A	R	L	S	R	D	A	N	A	R	I	R	I	I	
4369	GAA	ATT	GGG	GCC	GGT	ACG	GGG	GGC	ACC	ACC	GCG	ATA	GTG	CTG	4410
	E	I	G	A	G	T	G	G	T	T	A	I	V	L	
4411	CCA	ATG	TTA	CAA	GCC	TAT	CAG	GAT	CAT	ATC	GAT	ACG	TAT	TGT	4452
	P	M	L	Q	A	Y	Q	D	H	I	D	T	Y	C	
4453	TAT	ACG	GAT	GTT	TCC	AAA	GCC	TTT	TTG	ATG	CAT	GGA	CAG	GAA	4494
	Y	T	D	V	S	K	A	F	L	M	H	G	O	E	

FIG 14B (cont'd)

4495	CAC	TAC	GGC	GAA	CAA	TAC	CCC	TAT	CTG	AGT	TAT	TGC	CTC	TGT	4536
	H	Y	G	E	Q	Y	P	Y	L	S	Y	C	L	C	
4537	AAT	ATT	GAA	CAG	GAC	TTA	GTG	GCT	CAA	GGG	ATC	AGC	GTT	GGT	4578
	N	I	E	Q	D	L	V	A	Q	G	I	S	V	G	
4579	GAT	TAT	GAT	ATT	GCG	ATC	GCA	GCC	AAT	GTA	TAA	CAT	GCC	ACG	4620
	D	Y	D	I	A	I	A	A	N	V	L	H	A	T	
4621	CGG	AAT	ATA	CAC	GAA	ACG	GTC	AGC	CAT	GTG	AGG	CAG	GCA	TTG	4662
	R	N	I	H	E	T	V	S	H	V	R	Q	A	L	
4663	GCG	GCC	AAC	GGT	TTA	TTG	ATT	TAA	AAT	GAG	TTT	AGC	CAA	AAA	4704
	A	A	N	G	L	L	I	L	N	E	F	S	Q	K	
4705	AGC	GTT	TTT	TCG	AGT	GTG	ATA	TTA	GGT	TTG	ATC	GAT	GGT	TTG	4746
	S	V	F	S	S	V	I	F	G	L	I	D	G	W	
4747	GCC	TTA	TCT	GAA	GAT	ACG	GGA	TTG	CGT	ATT	CCT	GGA	AGC	CCA	4788
	A	L	S	E	D	T	G	L	R	I	P	G	S	P	
4789	GGG	TTA	TAT	CCT	AAG	CAG	TGG	CAA	GCG	GTA	CTG	GAG	GGG	TCG	4830
	G	L	Y	P	K	Q	W	Q	A	V	L	E	A	S	
4831	GGT	TTT	GGT	GAC	GTG	GAA	TTT	CCG	CTC	CAT	GAC	GCT	CGT	GAG	4872
	G	F	G	D	V	E	F	P	L	H	D	A	R	E	

FIG 14B (cont'd)

T G T T C G A G G G G G G G

4873	TTG	GGT	CAA	ATC	ATC	CTG	GCA	ACC	AAC	CAT	GCG	AAC	4914
	L	G	Q	I	I	L	A	T	N	A	H	A	N
4915	GTT	GCT	AGC	GAT	CTT	GCG	ACA	TCG	GTG	ATT	GAT	CAT	GCC
	V	A	S	D	L	A	T	S	V	I	D	H	A
													P
4957	AAG	AGA	TTC	CCA	TCC	GCC	GAG	GTC	AGC	ATG	GAT	GAG	AGA
	K	R	L	P	S	A	E	V	S	M	D	E	R
													V
4999	AGC	CAT	GAT	GCC	ATG	ATG	AAG	GCA	TCG	GTC	AAA	CAG	TTC
	S	H	D	A	M	M	K	A	S	V	K	Q	TTG
													L
5041	GTA	GAG	CAA	TTA	TCC	CAG	TCT	TTA	AAA	CTG	GAT	ATG	AAT
	V	E	Q	L	S	Q	S	L	K	L	D	M	GAG
													5040
5083	ATT	CAC	CCT	GAC	GAA	TCC	TTT	GCC	GAT	TAT	GGT	GAT	TCC
	I	H	P	D	E	S	F	A	D	Y	G	V	N
													E
5125	ATT	ACC	GGT	GCT	AGT	TTT	ATT	CAA	CAG	CTT	AAT	GAC	ACG
	I	T	G	A	S	F	I	Q	Q	L	N	D	CTG
													5166
5167	ACA	CTG	ACT	TTA	AAG	ACG	GTG	TGT	TTG	TTT	GAT	CAC	AGC
	T	L	T	L	K	T	V	C	L	F	D	H	TCG
													5208
5209	GTA	AAC	CGA	CTG	ACG	GCC	TAT	CTG	TTA	TCT	GAC	TAT	GGT
	V	N	R	L	T	A	Y	L	L	S	D	Y	G
													D

FIG 14B (cont'd)

5251	GAT	ATC	GCG	CAG	TGG	TTA	GCA	ACG	GCA	CCA	GCG	TTG	GTT	GAT	5292
	D	I	A	Q	W	L	A	T	A	P	A	L	V	D	
5293	CAT	CCA	CAG	AGT	GTC	GTC	AGT	CAG	GTG	TTG	CCT	GAA	AGG	TCG	5334
	H	P	Q	S	V	V	S	Q	V	L	P	E	R	S	
5335	CCA	GCA	AGC	ACA	CAA	GCC	AAG	CCC	TTG	CCT	TCA	GTC	CCC	CCT	5376
	P	A	S	T	Q	A	K	P	L	P	S	V	P	P	
5377	TCG	TTA	TCG	ATG	GAG	TCA	CCC	GTT	CAA	CAG	GAG	TCG	ATA	GCG	5418
	S	L	S	M	E	S	P	V	Q	Q	E	S	I	A	
5419	ATT	ATT	GGT	ATG	AGC	GGA	CGG	TTT	GCG	GCG	TCA	GAA	AAC	CTG	5460
	I	I	G	M	S	G	R	F	A	A	S	E	N	L	
5461	GAA	GCG	TTT	TGG	CAA	CAG	TTG	GCA	CAG	GGT	GTG	GAT	TTG	GTC	5502
	E	A	F	W	Q	Q	L	A	Q	G	V	D	L	V	
5503	GAA	CCC	GCG	TCA	CGT	TGG	GGG	CCA	CAA	GCG	GAG	ACT	TAC	TAC	5544
	E	P	A	S	R	W	G	P	Q	A	E	T	Y	Y	
5545	GGC	AGT	TTT	CTC	AAG	GAT	ATG	GAT	CAA	TTT	GAT	CCT	CTC	TTT	5586
	G	S	F	L	K	D	M	D	Q	F	D	P	L	F	
5587	TTT	AAT	CTC	TCC	GGT	GTG	GAA	GCG	AGT	TAT	ATG	GAC	CCG	CAA	5628
	F	N	L	S	G	V	E	A	S	Y	M	D	P	Q	

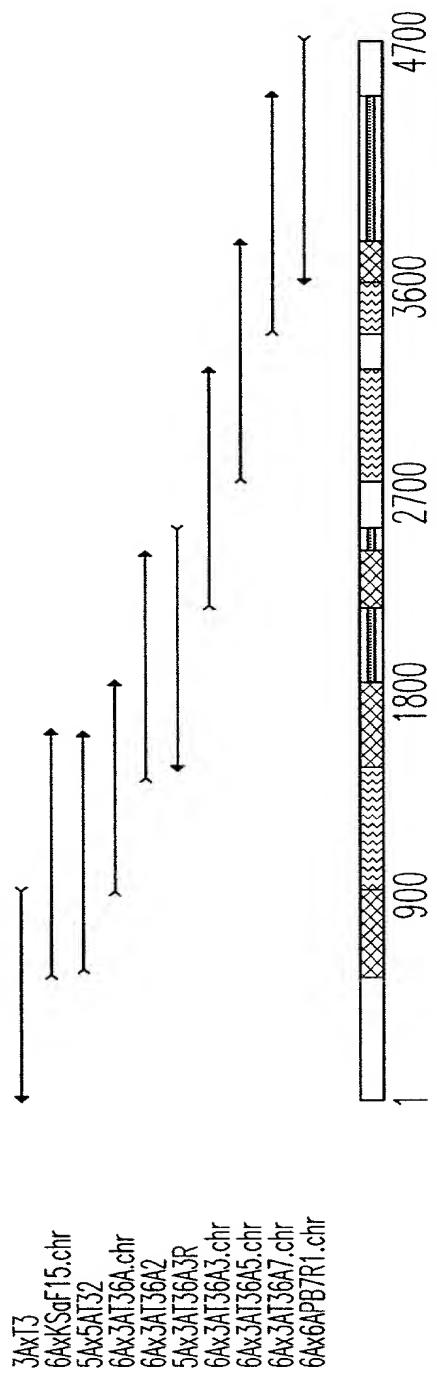
FIG 14B (cont'd)

5629	CAA	CGT	TGT	TTT	CTG	GAG	GAA	TCC	TGG	AAT	GCA	CTG	GAG	AAT	5670
	Q	R	C	F	L	E	E	S	W	N	A	L	E	N	
5671	GCG	GGT	TAT	GTG	GGT	GAT	GGC	ATA	GAA	GGC	AAG	CGT	TGT	GGT	5712
	A	G	Y	V	G	D	G	I	E	G	K	R	C	G	
5713	ATT	TAT	GCC	GGT	TGC	GTG	TCC	GGT	GAC	TAC	GCA	CAA	CTG	TTG	5754
	I	Y	A	G	C	V	S	G	D	Y	A	Q	L	L	
5755	GGC	GAC	CAA	CCC	CCG	CCC	CAG	GCT	TTT	TGG	GGC	AAT	GCC	AGT	5796
	G	D	Q	P	P	P	Q	A	F	W	G	N	A	S	
5797	TCT	ATT	ATT	CCC	GCC	CGG	ATT	GCC	TAT	TAT	TTA	AAT	CTT	CAG	5838
	S	I	I	P	A	R	I	A	Y	Y	L	N	L	Q	
5839	GGC	CCT	GCT	ACC	GCG	GTG	GAT	ACT	GCC	TGC	TCA	AGT	TCT	CTG	5880
	G	P	A	T	A	V	D	T	A	C	S	S	S	L	
5881	GTG	GCG	GTG	CAT	TTG	GCC	TGG	CAG	GCC	CTA	CAC	CTG	GAT	GAA	5922
	V	A	V	H	L	A	C	Q	A	L	H	L	D	E	
5923	ATG	GAG	ATG	GCC	TTG	GCA	GGA	GGT	GTG	TCT	CTT	TAT	CCA	ACC	5964
	M	E	M	A	L	A	G	G	V	S	L	Y	P	T	
5965	CCC	ATC	ATT	GTA	TGA	GTC	TTT	GCG	TGG	TGC	AGA	TAT			6000
	P	I	I	V	Z	V	F	A	W	C	R	Y			

FIG 14B (cont'd)

WGS genome assembly

CONTIG 2



CONTIG 5

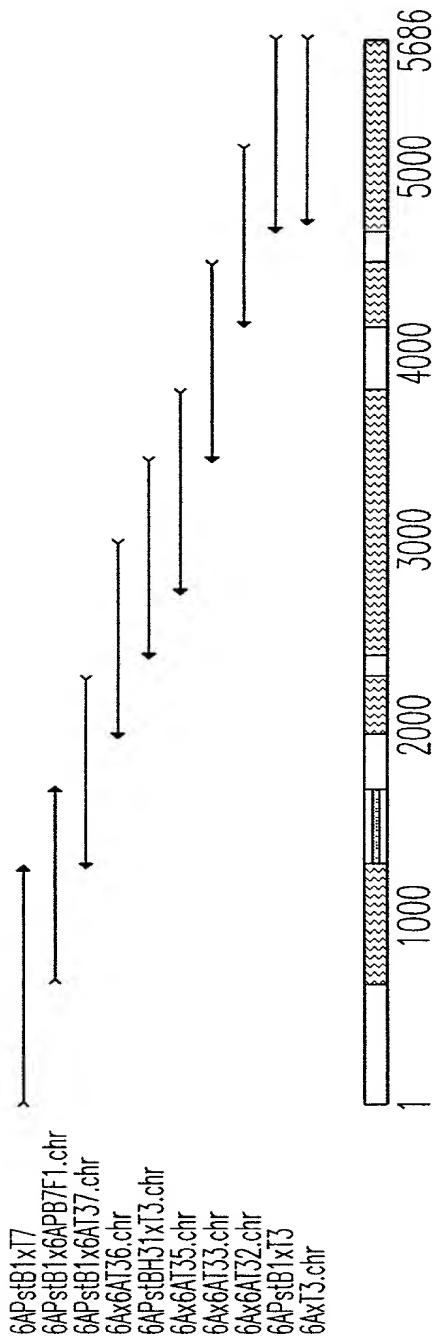


Fig. 15A

*Contig Sequences from Cosmid 6A**Contig 2*

ANCAATTATNACATCCNCGGAAAANACGAACGGTCACCATNTAGGCAG  
 GCATTGCGGCCAACGGTTATTTTTAAATGAGTTAACCAAAAAAGNGTT  
 TTTGNAGTGTAAATTGGTTGNCGANGTTGGCCTTATTAAANANAGGGA  
 TTGNGTATTCTGAAACCCAGGGTATTCTTAACAGTGCAANCCTACT  
 GAGGCGTCGGNTTGGTTACGTGAATTCCGCTCCATGACGCTCGTAGT  
 TGGGTCAACAAATCATCCTGGCAACCAACGCCATGCGAACGTTGTAGCG  
 ATCTTGCACATCGGTGATTGATCATGCCCAAGAGATTGCCATCCGCC  
 GAGGTCAAGCATGGATAAAGAGTAGCCATGATGCCATGATGAAGGCATCGG  
 TCAAACAGTTGGTAGAGCAATTATCCCAGTCTTAAAAGTGGATATG  
 AATGAGATTACCCCTGACGAATCCTTGCCGATTATGGTGTGATTCCAT  
 TACCGGTGCTAGTTATTCAACAGCTTAATGACACGCTGACACTGAYTT  
 KRAAGACKKTGTGTTGCTTGTGATCACAGCTCGTAAACCGACTGACGGCC  
 TATCTGTTATCTGACTATGGTGATGATATCGCGCAGTGGTAGCAACGGC  
 ACCAGCGTTGGTTGATCATCCACAGAGTGTGTCAGTCAGGTGTTGCCTG  
 AAAGGTCGCCAGCAAGCACACAAGCCAAGCCCTGCCTTCAGTCCCCCT  
 TCGTTATCGATGGAGTCACCGTTAACAGGAGTCGATAGCGATTATTGG  
 TATGAGCGGACGGTTGCGGCGTCAGAAAACCTGGAAGCGTTGGCAAC  
 AGTTGGCACAGGGTGTGGATTGGTCAACCCGCGTACGTTGGGGCCA  
 CAAGCGGAGACTTACTACGGCAGKTYCTCAAGGATATGGATCAATTGA  
 TCCTCTCTTTTAATCTCTCCGGTGTGGAAGCGAGTTATGGACCCGC  
 AACAACGTTGTTCTGGAGGAATCCTGGAATGCACTGGAGAATGCGGGT  
 TATGGGGTGATGGCATAGAAGGCAAGCGTTGGTATTATGCCGGTTG  
 CGTGTCCGGTGAACACGCACAACGTTGGCGACCAACCCCCGCCAGG  
 CTTTTGGGCAATGCCAGTTCTATTATTCCCGCCGGATTGCCTATTAT  
 TTAAATCTCAGGGCCCTGCTACCGCGTGGATACTGCCTGCTCAAGTT  
 TCTGGTGGCGGTGCATTGGCCTGCCAGGCCCTACACCTGGATGAAATGG  
 AGATGGCCTTGGCAGGAGGTGTGTCCTTTATCCAACCCC:ATCATTGTA  
 TGAGTCTTGCCTGGCAGATATGCTCTCTCGAGGGGGCGTTGCCACA  
 :GCTTGATGCCCTGTGCCSACGGTATCGTCATTGKGAATGGGGGGK  
 GGTG:GG:GCTAAAACGCTTGTGGCGGCATTGGCGGATGGC:AATCA  
 TATTACGGAGTGATTGCTGGCAGTGGTATCAA:TCAAAACGGTCGTAGT  
 AAMTGGGAATACGGGCACCCAGTGCACAAATSCAAAGAACGCTTGGWAAC  
 GTTGGGTT:TATGATCGCTTGDTGYYAACCTTKAGCAHATKAGCATGKT  
 CGAAGGCCVDTGGACAGGGCACGRGDYTTAGGTGKACCCARTGAAAYRT  
 DAAACYTTAMACCCGGVGGTTAGACACTWADACGSATAAAAGAAHAATD  
 HTVGVGCHATCGSGTCGGC:CAAAACCAATATGGAMACYGGSACCATGGT  
 WGGCTGGGDTGGGGGGCTTGTGGATRTKAAAG: TGGTGTGTCGAT  
 GCAACACCGGAAAATACCTCCATCGCTACATTACTCAGGGCAATCCG

**FIG. 15B**

AATATTGACTTGATCGCAGTCCTTTATGTGAACACCGAGCTCGTGA  
 TTGGTCGGTGGGTGAAGGAGAGACCCGTTGCGACGGTGAGCGCCTTG  
 GATTTAGTGGTACCAATGCCCATGCAGTGTAGAAGAAGCGCCGCAGTC  
 GTGCGCCAACATGAAGAGCAGCCGGTTATTTAAGTGGTCTTATCGGCC  
 ATAGTGATGATCAATTACGGCAGCAAGGTTGAGAACTTTATGCAGGGTTAT  
 TGTGAGCATCACCCCTGAGTTGATGTGGCAARTCYTGAGRTTATACCTT  
 ATTG : TTGGG : TCGTCAACATTGG : TCGCATCGTCTGGCTGGTG : TGGCG  
 T : GTGATCTTGGAGGATTGCGGCCGGTCACTGGATCAGTGG : TTGGGTAG  
 GGTAAAGGCTCCCCGAGTGTATGT : GTCT : GCA : TTGGCTGAGGGTGAACC  
 AC : GTCTA : CAAGTTCTCTACAGCACGTTGGTAATGAATGTATAAGAGC  
 A : TGCAGTGAGTCCTGTTCTGCGAATCACTATGGACGCCGTATCGACG  
 GTGGGGGAWTATATGTTAGGGTTATCCATTGGAGTATGGTGTGTTGTT  
 TGSCCAKGGCWATRRWCKTWTTSSKTTKCCGAMCTAKSSGTTSCWARKC  
 AGCGTTGTTGGTACCAACAAATAAGCCACTCCACAGTGGATGCTATA  
 TCACAGCATGCTTTTACATCCTTGTACATCGAAATACTTCGGACTT  
 TTCATGTCAGCGTTTAGCTCCACATTAATGGGAGTGAATTGTTCTTA  
 CTGACCACCTTATTCTAGGCAAAAGATATTGCCCGAGCCGMYMTTTC  
 GAAATGGTCCGAGAGGCCATCAAACAAAGCTTGTGGATTGGATAATT  
 TGAAGTTGTTATTCAGCTCAATGATATTGTATGGACAAAAGTGATTGCAG  
 TTGATGATGATCAAAGAAGTACATATTGATCTTTGTAGAAAATGG  
 CAGTGAATCATGCTAACGCATGAGTTGATAGGCAAAACATATCGCTTA  
 ACTATGAAGTTTACGCAAAATAGTGAGGGAAATGGCAGGCAGAATAAA  
 AAAATTATTCTATAATCACSGCATGGTCACCTTGAGTTCTTGAATACAA  
 CCGGAGGTTGTAGATCTTGATGAACACSCMCCMCTATAATCAASCAA  
 GTCTTANATGCTGAACAAATGTTATTGGCGTTGGAATCAATARGTGT  
 CAKWWTGGTACAGGCMCCGATGTATARATACSGTWTATWTCGGTGAGCA  
 TCAAGTATTARCMAAACTYTYTWTGCCAGAAATTGCAGGAGAWTTGGATA  
 ARTSCTTGTGTTGCACCCAGGCATGGTAGATTCTGCTTACAGGCCACA  
 TTGGGTATTACTTCTGATATCAATGATATCATGTTAGCCGATGCCAAGC  
 CGATTATATCTGACCCCCAAGTCGACGCTCCCTTGCTCKWMAAAS  
 TKAATWAYSGAAAAYGTWCAGATTCTATGTGGTTGGATTCKAAAT  
 TCTTATCGACAGACCAAAAGTCTCCACGCTCAGCCGTTAATGATATAC  
 AACATCTGACATTGATCTATTGGACGCTCAAGGAAAAGTATGTGTGCGA  
 ATGCGAGGTTCTGTCTGGGTTTGCCAAACAATGGTTAATTCACTA  
 SCAGAAGAACCGTTACAGCTTGAATAACCAGCAAGCACC : TTACTTT  
 TCCAATCCCAGGTATGGCGTT : CGCCAGACTCTTATCCAAGTGGCCAATT  
 AACCCTACCTAAWTGATGCCCGTCCATCCTGGGGTGGTTGTACGNAT  
 TTGAAATATGGACTTAATGTAGAAAATAGAAGGATGTAGAGGTTATTGA  
 CCTTACACTCCAAACCACCTGGATTACAGGATCGCTACTTGTGATATT  
 TGCAGTGCAGGTATTGAAATTGAAAANGACGTAATGATAGATAAATCC  
 GTACAACCAGTACTGATTCAAGTTAGTTCTTAATGATGGAGAACAGG  
 GGTATTCAACCAGTTATTGGCATTACTAAAGGTGGCTCGCTCAGAAAACC

FIG 15B (cont'd)

CCAAAGTGATTACACAATTCAAGTACAATAGTCCCGCAAACCTCGC  
 AAAATTACTACGGATTATCACTGAAAATAGTCATGATATAACACATGCA  
 GAAATTGTTATCACTGGNATCAACGTGAATGTTGKTTGGKAASCAG  
 TACCCAAATCTACAAAACYTTACTCAACTCCCTGGAAATCTAACAGWGT  
 TTATYTCWTTMCGGGAGGKACCGTGGATTAGCGTCACAGTTGTCAA  
 GCGWTAGCAGTGAGTCCCACAAAATCGGTATTAATCTKGTAGGKCSKTC  
 ACCACTCMATGRTGAAAAGAAATCTTAWTTAACTAGAACTGGRATCCGTT  
 GGGGACCATTATTAATMCTATCARAACRGATGTAAGCCAACANGGATC  
 AAGTTAAAGCWTGTTAARAAAATTKTTASCWTCMCGGTCAATTGAAW  
 GGKGKTTTSYATTGTGCAGGTATTGTCAACGACAATTTATTCTCAAAAA  
 GTCCTCGACAGAATACAAAGAGGTATTGTTGNTAAAGTATCNGGTNCTG  
 TCAATTAGACCAGGCANACANAGNATAGAGATGGATTTCTTATNNTA  
 NTAAAAACGTTATCTGAGTATTGGANNACAGNACAGGGTNTTAGATA  
 ATNGTCCAAATACTTTCCAGGTGTTGGTAAANGGATTGGAANCAA

*Contig 5*

TOPPER - 369372760

GCNCTTNCCGCGGTGGCGGCCGCTCTAGAACTAGTGGATCCCCCGGGCTG  
 CAGTATTGCGAAATGCAGGTCAATCAGATTATTCAACGGCAAATAAATT  
 ATGGATGAGTTGCACGCTATCGTAATGCTCTGGTCAATCGCAAAGAGCG  
 CTATGGTTAACACTATCGATTAATTGGCGTACTGGAGAGAAGGGAGGTA  
 TGAGTATTGAGGAAAATTGAAAATATAATGCAAGAGAATACCGGTATG  
 TCCGCCCTGGAGACATCACAAGGTATTGAAGTATTACAAAGAGCTTGGCA  
 GTTGCAGTACACGCAATTGTTGTAATGGTCGGAGAGATGAAGCGAATGG  
 AGAGCTTTTGACAAGCAGGGTTCGAGCAGATTCTGTGGTATCCGCC  
 GATACTGTCAGCGAGAATAAAACCTCGACTATTGAGAATCTTCAGCCGA  
 TGTAGATACATTACCAATTGAGGTTCAAGGATACAATATGGAACAAA  
 AAACCCCTGATTACTTAAAAAATGTATTGCCACCACAACACAAATCCCC  
 GAGAAAAATATTATGTCATGAAACATTGGATAAAATACGGAGTTGATT  
 ATTGTTGGTGTGAAATGACCAATCAATTGGAAAAGTATTGGAAAAT  
 TATCTAAAACCTATTGGATGAAATATCAAACCACTCGCGAATGGGCGAT  
 TATTTCCTGAAATTTCATGATGAAAAGTTAAGGGAGTTTTCAGATAGA  
 TAGCAAACATCTATGTTAAATAATCAGGAGAGATTGAAGTTCAAAAAA  
 AAGGGGATGAACCATCGGTTGGAGACAGATATAAGTCAGCTGGATGCCGT  
 GCCTATCTCGGTTATATCGCCTGTGTAGCAGTGAATCATCAACCAAAA  
 AAATGTTAACATGGTCCMATANTCATCAGCCAGTAATGGGATATTGGC  
 GAWTATTGGGCTGAGKGGTCGTTATTCCMCAAGCCTGAGAAATATNGG  
 AGGGAAATACTGGGAAGAAATTGTTGTCAGGCAAGGGACTGGTATTAN  
 CNGGAAANTTCCAAANGGAGCCGTTGGGATTGSAAGACTATTWYACMS  
 MTNNNGATCCSTATTAGCCMGGTGGACATCGCAGTAAATNGGGKGGT  
 TTTATTCGGGATGTTGATAAGTTGATCCGTTATTTTAATATTC  
 TAGKGRGGKGAGCTYRCTSATCCTCAGGAAYKWTATTTYCTAGRGTCC

**FIG 15B (cont'd)**

GCGTKGGCTGCATTGGAAGACCCCTGGAWATTGCCGGGNATTATTGCAAAT  
 TGTTGTCATCAAGGACTAAATCTTCATTCTCGTCGGRAGATGTTGGTGT  
 TATGTGGRAGTRATGTCTTCAGAATATCAGTTGTTGCTTGAACAGAA  
 WTTACGTGGTCACCCCATATCCTCNGGTTGGGAGTTATGCCAGTATTGCT  
 AMCCSGGTGTCTTATGTTTARATCTACACNGGCCAASCATGACAGTGG  
 ATMCATGTGKTCTARTCGTTAACGACGCTWCACCTAGCATGKCAAGGGA  
 TTTAAAACGGGKCGAAACTGACCYGGGTATTGKCGGKGGAGTTAAWATT  
 ACCATTCACCCMATAAATATYAGGCSTGAGTCACGCCAAATTATTTY  
 TACTAGTGGTSGTGCCAAARTTTGGTGAACAGGGACAGGGTTATATCC  
 CTGGTGAAGGAGTGGGTGCCATAAACTGAAGCGCTGGTCATGCCGAG  
 CGTGACGGTGATCATATTATGGTGTAAAGGCAGTGCCGTTAACCA  
 TGGTGGTAAAACCAACGGCTATAACGTTCTAAATCCGAATGCACAACAGC  
 AAGTGGTGAGTCGTGCACTACGAGAACGCCAGTAAACCCCCATCATGTG  
 ACTTATATTGAGGCACATGGAACAGGAACCCAATTGGGTGACCCGATAGA  
 AATTACTGKTCTRAMMAAGCGTTCAATAGTTGACCAATGAGCTTGGTT  
 TAAGCGCTGTGSCCAAACMATYKGTTGATCGGSTCARKGAAGTCAAA  
 TATAGGGCATTGTGAGYCASAAGCCGGTGTGCAGCTATTAGCAAAGTA  
 TTGTTACAAATGCAACACGGTCAAATAGTCCCTTCTTACATTCAAAAG  
 CATTGAATCCAATATTGATTTACTGTGACTCCCTTGTAGTAAACCAA  
 GGGTTATTGGACTGGAAACGACTTGAAGTTGAAGGAAAGAGGGTRCCGAG  
 AATKGCTKKYMWYWCKYTTTGGGGCCGGTGGCTCAAATGCCATGTAG  
 TGATTGAGGAGTACGTTGCCAGCAATGAAAAGCAAGAGGATTTCAAGGA  
 AAAGTAATTATCCCTTATCGGCWATAGACTTSKGATCARCTACAARAAA  
 WARKGGATCGTTGCTTAAGTTATCRAAAAAAATGAAGCAAARAGGTAG  
 GGAATKSGCTTAATTGWTYTTGCCAWACATTGCAACTTGGCGCGAG  
 GTCAATGARAGGAACGCTGGNCMTTNGANTGTAGGAATCNAATACCAA  
 ATGCTTAANGGAAAGATTTAGCAAAGGNTTAAATACTCAGAAAATNGA  
 TGCACANATTTTCCGATACTTATCAGTAAACGCTTATCAGGGTTCGTA  
 CTAGACCTGGGTGCGTGRATTCGCTATTTTCTGAAGATGAAGAATA  
 TGGCCAACACGCTGATATTTGGATTCAAAAAGGTAATACTTAAG : C  
 TGGCGGAGCTTGGTAAAAGGTGTGACTATTGATTGGAATAATGGTAT  
 AACGCATTATTAACCCAGAATAAATATTGAAACC : TCGTCGTATTAGTT  
 TGCC : AAC : GTATCCTTTCCAGGGATCGTTATTGGATT : CC : AAGTGC  
 TTTCCACAA : CAAACATTCTACAGTAATTGAGGCAGACGCCAACCM  
 AACATTGAATGAGCTACTGTGTTGAAGAAAATGGCAGGTGCAATCGG  
 AACTACATGACTCTGTCAGATCAATCTAATGTTATCAATACATTAAATT  
 TGTTTTTAACTGAGAAAGAGCATAAAAAGCATTACAACAATCAATATC  
 ATTCCATAGCCGAAAACACGATTGATTTCAGCCAGGCTCAGGCTT  
 ATGAGCAGTATTGATCAGATCACTATGCGGTTAATCCAGAAATAGGAAAG  
 ACGTACCAACAGGCTTCAACACATTGTGAAAAGTATTCAAAAGTGA  
 TGTCAACGGACATAATGTATTGAGGATGAACGCTGGATTA  
 CGTCTCCTCTACCTATTGTATCTTTAAAAAGTATTGAGGTTCTTA

FIG 15B (cont'd)

TTAAAACCARAAAATTACTATTGTTGGAGAATTAGACAAGCTTAKC  
 RRCGAYTGTYACYYKRAAKCCWRGKKGGWTTYGMAMRWYCKWAKSGTT  
 DGTGCAACSGRATWTKRAGGTTGCGGTGTTATTARAGGCMRTGGAAGGTA  
 CTYAATCCCATMCAGTGACAAAGCAAATGGATCTTGGATAGAAAATTG  
 TGGTCGTCTTAAAAGCCAAAAGTCATAGTAGCTTATACCAAAATGG  
 TCGTAGATATTCTGAAAACCCAMCCGCTGCAANCTTGTATGACACC  
 AAAGTATTCAAATGCTTACAGGGRACTTATTGATAACAGSTGSYTGTGR  
 AGGACTGGGTTTGTCTTYGCAGATTATTTCCAAGACATATAAAAATTA  
 ATCTGATATTGGTGGCGCTCTGATCTGATAAAAGAGAAAGSWWTGSR  
 RATWCRGRMTYKGKWWMAATCAGGTAGTCGAGTGGTTATGTCAGACGG  
 ATATCTGCGATGAAAAGAATCTCCAATTGGAATTGGATATTGCCAAAAA  
 TATTGTGGCCCTATTCAAGGTGTCATTGATGCCGGCATATTGATCA  
 GAAGACAATTGAAAGTCTGAAAACCTTCAAGCAGTATTAGGCC  
 NTAAAATTCAAGGTACATTGATTCTGGATAACGTATTGTCAGCGCAATCA  
 CTGGATTATGTTACTTTCTCAAGCTCGGCTATTAGGTGATGC  
 AGGATCATGTGATTATGCAATGGCTAACGATTGGCCATGCAC  
 AGTATAGAAATACCTYGGTATCTGAARGAAAAMSCAAGGGRAAGACMCTG  
 KTTWTTCAATTGGCCCGCTGGAATGTGAAAGGAATGGGATTGAATGGACT  
 GGAATGAGAACGTGAAAMCARAGTTCTWTTAAGTCCAAGCGGGCAASG  
 TCTATTGGACATAAAGGAAGGGTGTGAGGTTATTGAACACATTRCTGGCT  
 CAGGATTATTTCAGTGTCTAWATTGGSTGGKAGGAAAAACNGTATCW  
 AACAAATTGGGTCTCACACAAAGATGTTCTNACCTCACAAGTGAGT  
 CAAGGGCAGGMAGTRAWGAACWWASRRSWKKMYKRRASSKSYAMYAAAC  
 GAGCTGAGATAGAAGACTTAAAGTGTGAAGAATGTATTATTTGGACTT  
 AAAAACTCTGATTACAGAGCAACTAAAATACCCATCAGCTCATCTGGAT  
 GTAGAGAGTAATTAGCAGATTGGTTGATTGGTCAGTTAGCAA  
 CTTTCCCGTGSTTAAGTATTCTACATTYCAAWATACGCCRTSTK  
 TATTTTCGGATATCCTACCATAGAGCGTYTAARCCGTATTTTAAAA  
 GAACMCMCTGCGSTTATGGAGGCCTTATCAGCAGAAAAAACATYTWA  
 TAGTAACAATACVCTGTCG : TATAGTCYTCATGTCAAAGAAAAGCCGW  
 CAACTGATCTAATATCATCCARC : GCCTCT : CCTTTATTGCAGATCCAT  
 TGCCCCCTCAGGSTATGGAGAGTATTGATGAGCCTATTGCCATTATTGGT  
 ATGAGTGGTCGTTTCCAGAAGCGCTACGG : TTAAAGCAATGTGGGAGA  
 TTTTATCCGAAGGTAAAAGTSYGTGAGGAGATTCTATAGAGCGCTTT  
 A : ATTGGCATGAATATTGAACACCCATCGGATGATGTTYGAA : AA : DB  
 TAATAGTAAATGGAGYGCCTGCATTCTGGTATTAAAGAATTGATCCAC  
 AATTTTCGAAATTCTCAAGAGAGGAAAAARCTGGACCCCTTTCAA  
 CGGCWCTTATCACAGGAATCMTSGAATGCATTGGWAATSGCTTATGK  
 WWWMYWACRCWKWGMTMWTWARACRATGGATAYKKATTGGRTTGAW  
 SMAGGKTWTATMMRRYMWGMTCAATKMRGWTGACSGCACACWTTAWC  
 CATMAKRMTATTTTRGCATACCMGTYTGSCAGTWYTYWTARAKYTTAAT  
 GGSCMWRSSATGGCWRTWAAWRCCGCWTGYTCCTCCGSYWTGGYYGCRMT

FIG 15B (cont'd)

TCACCAGCTKSCSYSAGTTACKWCARCAAGCAATKYGAWRCGSCKAWK  
GWCSCGGCAGCWWYTTRMWMWYACRSSKSAWSWTKAWSTGGSCWTGAY  
SSAWGSGRGYMTGAKMYSACMWGAWGSYATAMYGAWAKACCKARNRTCAM  
CSYGCCAAKSGCRYAGTGYTGGAKAGSMWGYTGWTGCARTCGTAYTGMA  
ACRWMTCTTKSGGGKTTCCAAAAGGGGTTMMAAAT

*FIG. 15B (cont'd)*

5A PstI F4/C2

5A PstI2/F4/C2

5APstI2/5APt272

5APstI2x17

5APstI2x7R

5APstF4x17

5AX5APt27R2

5APstF4x5APt432

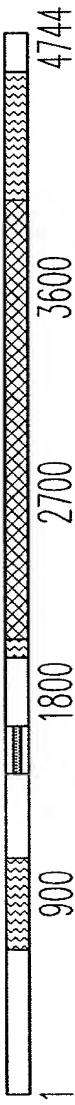
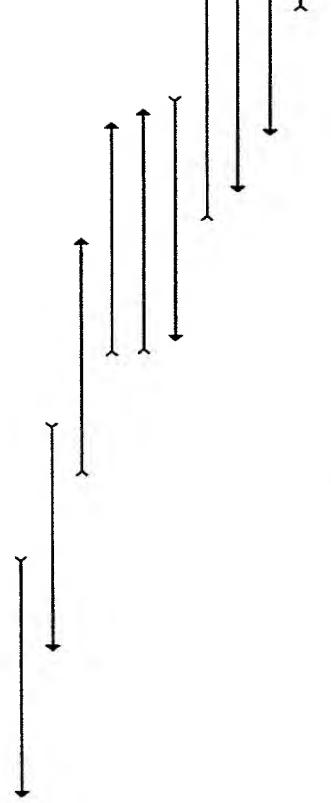
5APstF4x5APF432

5APstF4xT3

5AX5APC27R

5AX5APF43R

5APstC2x17



5A PstI C2 T3 end

5AX5APC23R

5APstC2xT3

5APstC2x5APC232

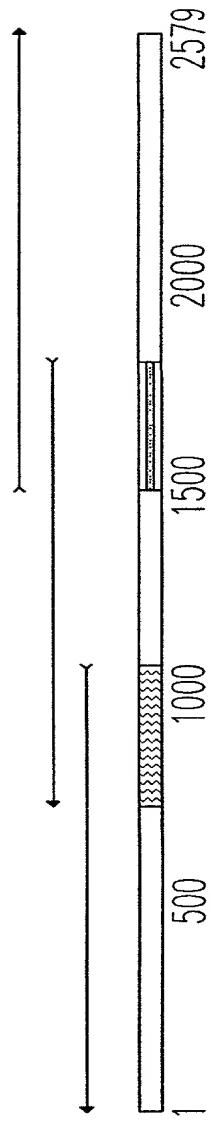


Fig. 16A

### *5A Pst A2/F4/C2 Overlap Sequence*

GNGATGAGATTGATGAGAATACTTAATTGGTCGAANAGGCCATTACNTCTATGATTCTGGTGAATTATAAGCCAATTAAACCGNTGATTAGTTAGTTGGATATGAAAGAACCGTTTATTTGACTATCNGAATATTAAACTTATCGAATATGATCGAGAATGAACCTCGAAGCTGTTGAGGTATAGTTATGTTAGAA GTTATTAATAGATACTGCCATGGATACGTATTGTCGCCAGTGGTATTGGCCNTAGAAGAAAAGGGTTTTGACCTTTACAAGGAATAGATACTTACATTTGAAAGGGTATGACTAACAGATGCAGCGGACGAAAGAAATAAAATATCTAGTGATTTATAGAGCTTTAATTCTCTATGAGTCGCTATTAGAAAATATGGAAAGGCATGGATTAAAAAATGGATAGATCAATCCGGAGATAACTGGGTTATTCAAACCCCTGTATTAACCGATTGGATGGTGTAAATTATTCCTTATTACTAGAACTGAAGGAAAATGGTTATTTGATGCGTTAAAAAATGKWAATAGTCTAAATAAAATTATTTAGGNTGATATCGAACAAATCGGNTTCGCAAWGAAATTATTACACTATTTAAACAAAAGAACTGGCTCCAAGAAGAATRAAGAGACGTTTACTTCACAAAANTCTGGTCAATTNAYCACTCAACGAATTTTATTACCGCAATCCATTGCTTCTTATAAGCCCATGTTATCTCGGGATAACGGAATTAAATGTTGGTAATGCTAGGAGTATTTAAAAAGGGATTGCATGGAGAGGGAGAGCCATGTTGACCGAACCTTAAATGTTATTGGTAGTGGTTTCAACATCAAAGTACTTCGCTGATATCGAACCGTTAGTCATTCACTTAAATGATAMTTKACGATSRAYWSCGAAATRKRTTS CRRATATGGGTGTGGTGTGGACTCTACTAAAAAATATTACAATATTATCAAGGAAAATCTGCACGAGGAAACGTGTTGAATCACTATCCGTGGTACTTATTGGTATTGAGTATAATGATGTTGGTATTGAGTATAATGAAAGCCGTTGCAGGAAACTAACAAACACTGGCAGGTGTTGATACAAGACACTATGTTAAAAGGCATATTGGTGATCCTGAAGGAATGATAAGTGTCTATGTTAGGTATTAAAGATCC TGAGAATATATTGCATGTGCGTTCATTCGATGATCGTCCTTATAATTGACCCCCACAGAGGTGATGAATATTGAAGCACGTTCAAAGATATTGATCAGGGCGTGTATGTTGATTCAAGAGGTCAAGCAATATCGCCTGTGGTTATGATACAAAGTCTGGTGGAACATTAAACGCTGGTCTGTAAAGACGAAACATGGCTTATATTAGAAGTACATTCTCTTAAACCTGAGGTTGTC AACCAATATTGGATGAAAGTGAAGGTTGATGCCTATCATGGTTTCTCAATATTAGTATCGGCTGAGGATTCTAATATGTGCTGCAGAAGCTGGTTATTTCTAAACCTGATGTTCTCAAAATTATCCAAGGAACTTACCTTACTCGAATTACCCCTAAATTGAAAGGAAAGCCTTACAAATTCCGTACCCGAATGAAAATGATTGTCATTGATGGATTAGAAAAATTGTCGACCTAATAATCAATGTTATGCATTGATGACCTTCGCAACGCATAGATGAATACCCAAAAGGTCAATGTGTTAGAATTAAACAA TACCATTGTTGCAGTGTGATTTCACAAAAGGTATTAAATAGAGTGTAGGCAGGTGTTGGCARSWSWTGSCMDHGAATRTGBDWDAC

FIG. 16B

DATTTVTABATHACTBTTTATCAATDTAWTRCCAAAATAAAAAAGAA  
 TATGCCATMCAATTATTACAGTTATCTTCTATYTATCATGGTGTCAWA  
 ATGATGTTGAAGATGTTATGGTATTGATGAATGTTATCAGTGCTTAAAT  
 GAGAAAACGATACAAGCAGGCAGTTATGGAAAGTGAGTCAGTTGATGT  
 TTTATATTCCAAGAGTAGAAAAACATATTGCTAAGTATCCAATAGATAT  
 TGGAGTAAATGCTCTGGATGCAGAGCAGGAAATGGGTTGTTGGTGCTA  
 AGTGGTTACTATCTATTTCAAAGCCAAGGAGTGATGAAAAAATCAGGT  
 GAGTATTATCAAAAAGATCAATT : GAGGTTGATGTTAAATATTATTCCA  
 AATATTATCGATTATTGAGTGCTGACTCATATT : GAAAAAAAGAAA  
 GCTTATTCAATTCAAAAAAATAC : GGTGCAAACACTTCCAATATTGAT  
 GAATTGCTCTAACGATCCATTGGT : TGAGTTGCTTCGT : TTAAGCGT  
 ACGTTTCCTCTCAATATGCTAGCCTTATGCCGWTCTACGATTAATGGC  
 ATCGTGCCTTCTCGGTATGGAAATATTAACAGGAAAATACAGGC  
 ATGACATTATTTTCCAGAA : GGAGGGATGAATTATTGAAGGTATTT  
 TAAAGGCTATCAACTTCAGACTATTTAATCATATTCTCGCAGAGCTGA  
 TTTATGAAAGGGCTA : ACGCTCTATCCGGTGGTAATATGAA : TAAAACA  
 ATTCGTATTTAGAAAATAAGGAGCAGGTACCTGGTGGGCCAACAGAGTT  
 TGTATT : GAATAG : AGCTTCMCCGCT : CTCGAATGGTTATAAGAGTTTA  
 C : TATACTGGATATCT : CGTCC : TCGTTCCCTCGTTATGGGAGAAAAGT :  
 AGATTTYCCGATAAATAT : CCCTGGT : TGCAATATAAGGTGTTAGATAT  
 : TGAAAG : CAATTTAGA : TGCACAAGGGTTTACCTGATAGCTTGATA  
 TT : GTGTATGCATCTAATGTT : CTCCACGATACGAAAWTATATACAGTAT  
 ACCCTTCCCAGTGAAGTCACATGCTAACGCAAATGGC : TTGTTAATG  
 TTGAATGAA : TTTACTC : GGATGAA : GGATTGTTACTGTTACCGGTGG  
 TTTGTTAGATGGCCTTGGTTATATGAAGACCCCTACCAATCGATTGGATA  
 ATGTCGCTTGTAAATGTTGATCAGTGGCGATCTATATTATTAAATCA  
 GGCTT : AAAATGTTAAAGACTTGTACCTTACCTTGGAAAAACTTAATA  
 TTGAGCAAAGTCAAAGTATTGTCCTGAGTGGATTATGAAGACCTG  
 TCTAGTAATG : TTGAAAATGTTGGTGGAAAAATAATCA : TTGTTT : AGAAAT  
 AAAAAACTCACTC : TGAT : CCGATTACT : GTGGAG : AATAAAATTAG : TTA  
 CAATT : AAAAGACAA : TCMCWTCGTTA : CACAATAGTATTGGAAGAAAAT  
 ATTTTATAAAATTTAG : GGGATAAAAAGAAAATTAT : GGATTTTCT  
 CC : TAAACGCCCTTGATTGGAGTTATGGGTTGGATTCAATTGAAAC  
 CTAC : TTGGAA : TTAAAGATCATTACTCGGKRAGCMTYTCYATAAAAC  
 TRGAASMTACTTCKTMTKYMMAWKATKRAYRMTKSCKMRSCMTYTGW  
 KWCMTCCSAYATSATCMAGWTRASCYTSRWATRTCGMTARAKWCCCTA  
 TTACGGAAGAGATAATGACTGGAGGTACGTCAAGGGTAARAACAGGGCAA  
 TCGAATSAKAATGAAACCTATTGCGATTATTGGTATGTCYTGTTATTCC  
 AGGTGAGGTTACGACAGTTGATGAGTTCTGGGAATTATTAATACAAGAAA  
 GACATGCCRTCAACCCTACCTAACGGACGTGGCAATGGCCAKAAGGT  
 GTTGATCCATGGGAGCACAACCTGGCATTGATCAGGGTGGATTCTGGA  
 TGGTATTGATACTTGATGCCSACTCTTCGTATATCGAGAAAAGAAG

FIG. 16B (cont'd)

CGGAGTTWATGGACCCTCASCAAAGAAAATACCTGGAATTAARTGGCA  
GGTCATASAGCATGCCGGATATAAACCCATCGYTTTCTGGTCAAAGA  
NATYGGYATCTATGTGGGTGTTGTCACCGTAATTATATGGGAGTT  
ATTTAACTAAAAGTGACCAAANGCCCTAAAACCAACCGGNAAGGCCTAT  
TTKCATGACCARGTARTANATTGTTGTCGYTTMCCCCAATAANAATT  
TTCCTATTTNTATTAATTAAARGTGCCMSCTCCTCTWTCTGAT  
WCCGNNGCTTGTCAARYAGTTAGGTTGCCTWTTGACCCAANCARTTT  
TATGCGNATTCAATTGGGNANGGNGTAATCAGGCNTCTGGTGGGNTG  
GGGAYCAATTWAATRTCCCCTCCSMRTGAWACCGTTCTTNATTAYYWA  
GCAGGTNTGTTNTCAAAATCNGGAATGTAAACCTTNGATCCACCGCCC  
GTTGGTTTNTNCCTGGNAAAGGGGGCGCTNTCTTTTTNAATCNTT  
TTCTCANCCNATTTAAAANGATTGTTTTNGGGTTTAAAGGGGGG  
AGATAAAATNGGGGCAANCATTNNTACGGCCCTAACCTNNG

*FIG. 16B (cont'd)*

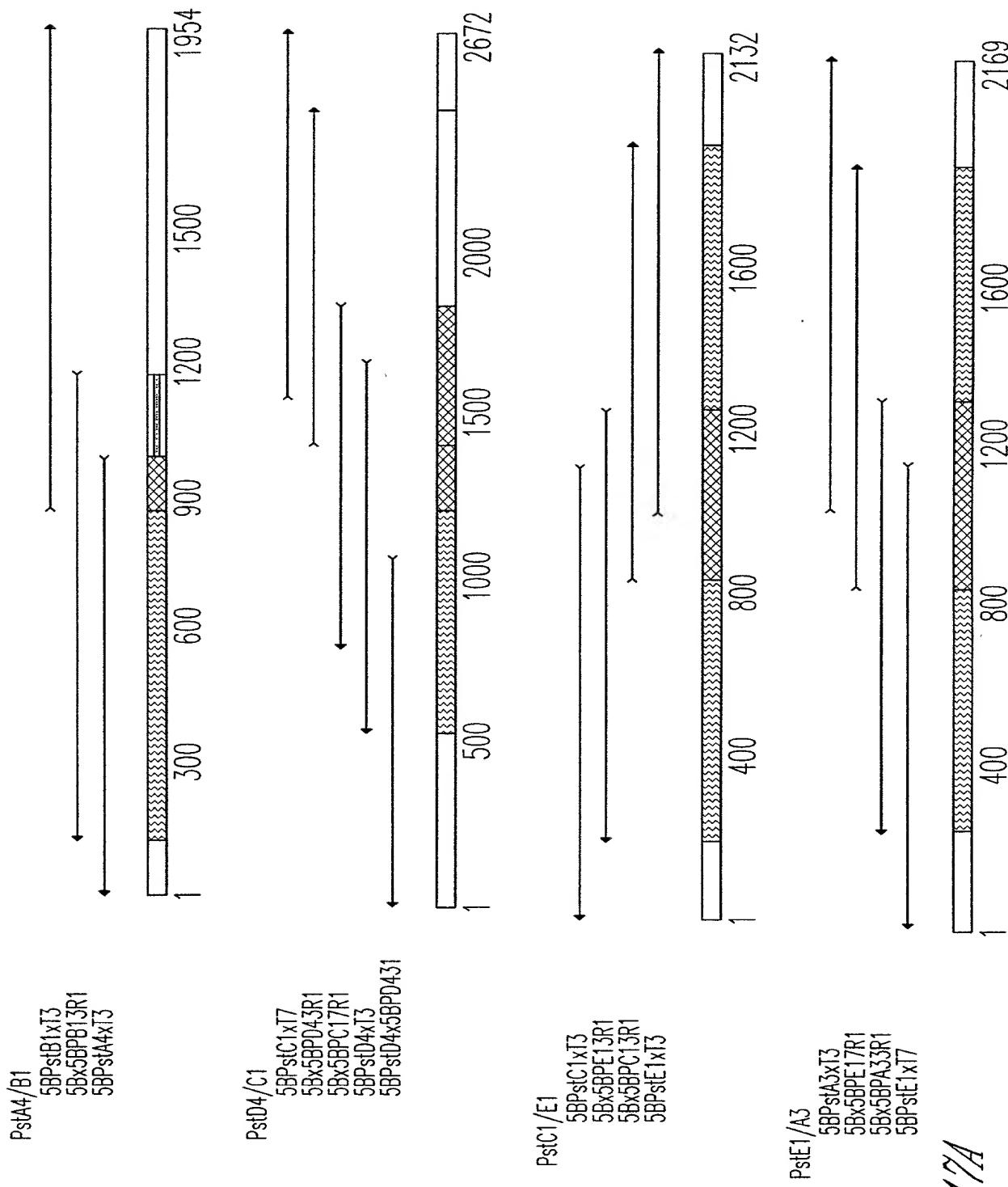


Fig. 17A

*5B PstI Fragment Overlap Sequences**5B PstA4/B1*

GANGATTCTNCCNCTNCCCATTGAAAAGAGGATGGATTNGANCATATGG  
 GTGTGCCTGCAAGAAGATAAGTCAATATAATGTAACTCAGAAAAATCAAT  
 TCCCAAAATGAATACCCNCAATCWATACAAAAAWATTGAWAGATTTT  
 KGGTKACATTACTAACTTTSGAGGCNAAGACATCMATCCMRGCMGGA  
 TGCCTGGTGAECTATGGTGKTGATTCCATTATTAGGTATGAGATTYYTAA  
 TCGAATTAACCYCCACCTTAAWATAGAAGCTGATGCTTATTACTAAC  
 GAAGGAACGATTMACCAGTATATCTCATAAARKWCMTTCTTTATTGTTG  
 ATAAAAAAAATTACCCAATGTTACCAATTGGATTAGAAAATGATTCT  
 AATAAAGAAAATAAAGGCTGGTAAAGCCTCTTTATTGAATTATTAA  
 ATTTGAAATCAATCCTGAATATATAGAAAGCAGTACAAAAAATAAAGATT  
 ACGCGATTCTTGAAAATCTAATAATAATGGAGTTGGAGTTGGAGAGAA  
 AATAATCATCTATGTTTGAGTTTTATGAAACTCATACAAATGAAAC  
 AATTAAAAAAATAGTGTTCACCCGAAACTTTAACTCTCTAGATA  
 AAGGTAAACGATACTTCCAAGTAGCTGCCAGCAAAAAACAGTCTATAT  
 CAAACGGAAGTTGAGAAGTTCCATATAATCTTATTCAAGGATTAGAGT  
 GGAAATGCCAGTCAATATTGAAATTAAATAAAGCATTAAATCATTGG  
 TTAACACATATTCAATTTCAGAACAAAAGCAATGTTGATCAATAAGCAA  
 TGGATTCAAGGTAATACATGATGGTTATCAGTAAGATGCGAAGA : AATT  
 YATACGAAGGATTATCTGCAGGAAAAAGATTTACGCAACAACTAAT : AG  
 TATTTCAAAAAGAGCAAGGTAAAAATTATTGATATCGATAATCTGCCT  
 TTATTAAAAATTATTATCCATAATGGTAAAGACTTAGCAGCTATT  
 TGTTCATGCGCATCTTGTGCCGATGGATTACATTTCCTTTC  
 AGAAAGAATTTCATGATACTTRTGAAAGTATTATRAACGGANTGGRRWAT  
 CCGGAAACGKGTCSAWAAGTGAATGGCTGAATATGCCACTTGCATTG  
 TGTGAATATAATCCAAAAACAAGGAGCTGACAAAAACTGGCTTGATAA  
 AATTGAGATAAAAATTCTTAAATTAAAGATAAGAAAGACTATG  
 TCGGTCAACTGTCAAGTGGAGAAAAATTATTGAGCTAGAAGTTCTGTA  
 AATATGCTGGAAAAATTAAAGATTATTAAATGATGCGAATAATACCAACT  
 GACGCAATTGCTATGTTGTGCTGTTGCAATTACTGTATGCCCTCGA  
 GGCTACCACTACCCCTGCAAATGGTCAACAGCCGTAGAGATAAAAGAA  
 TTTGAAATAATGATGGGTGATTTCATCAACTCTGCCCTATGGATTTA  
 GGAACCTTCCAAAAGCATTCTCTATTCCNGGATGGTACCTTTTAA  
 GTTATTGGAAAANGAAAAGGCNTTNAATTNTCCCCCNAGGATTTT  
 TAAANGGGTTGGATNNTNTCNGGAACCCCTCAANAAAAAAATT  
 TNNTTCCAAAAAAAGGGGCCCTTAAANTCCCCATTAAGGGAATT  
 TTAAATTTTTAATTCCCGGGAAAATTATTNTTAAATTCCCGGAATT  
 AAGGCNAANTGGAATTATGGNAAAATTCCANTTGGTTTAA  
 AGGGAAAAANCCCANNAATTGGGTTCCCTAAAAANAAAAAAAGGGG

GGNGGCCCGGTGGTTCTNNNTGGGGAAAAATTAAAAATTAA  
TTTN

*5B PstD4/C1*

ANCCGAAAAANACCNAAGGGNNCCGGCCNTGCCTNCAGTGCATNA  
TAAAAAAANCCAGTNATAAGNNGNNACAATANTCATGCCCGCGCCNCC  
GNAAGNAACCTNANTGGGTTNAAGGCTCAAGGGCATCGTCAAGGAACC  
TTTCGGCGGGCTTTGCTGTGCGACAGGCTCACGTNTAAAAGGAAATAA  
ATCATGGGTCATAAAATTATCACGTTGCCGGCGCGACGAATGTTCTG  
TGTATGCGCTGTTTCCGTGGCGCGTTGCTGTCTGGTGTCTGACATG  
AAATCTGGCACAGCGAATTGCGCGAGCTGGTTTGCTGAAACCAGACA  
CACAGCAACTGAATACCAAGAAAGAAAATCACTTACCTTCTGACATCAG  
AAGGGCAGAAATTGCCGTTGAACACCTGGTCAATACCGTTGGTGAG  
CAGCAATATTGCGCTTCGATGACGCTTGGCGTTGAGATTGATAACCTCTGC  
TGCACAAAAGGCAATCGACGAGCTGSRCSRMAKYGKGMCMCCGKMW  
CCTWMRARSTTWTCSCAAWRAGKTYWTTMAWMAAGSMCSCYGSKRKY  
GSWWWTGGWRCTAWCCACGMARCSSMWWTYGAAAMACCKSRKCYGGNTKW  
CSRAWAWMWACMRSMYCASCTTGGWAWMMARMRWSMTGASYYWGCKCWG  
AAMAAGKTWACCSTCRGKGCCGMTWWGKKCAAWKTTMACCYSRWRWWRR  
YMCMAAMATTGARRCSTTGMYCGRAACCSCGMITGAAAAA : : CGCTGH : TG  
: : AATGTRVGGCGT : TGGATGTCHCAAAGCAAATGGCASCAGACAA : GAA  
AGCGATGGATGAAC : : GGCTTCCTTATGTCCGCCGGCAKTCTGAT  
GGAATGTTCCCCSGGTGGTGTATCTGGCACCAGTGCCGTCGATAG : T  
A : TGC : AA : TT : GA : TAA : TT : ATT : ATCATT : G : CGGG : TCCTTT : CC  
GG : CGATCC : GCCTTGTACGGGGCGCGACCTCG : CGGGTTTCGCTA  
TTTATGAAAATTTCGGTTAACGGCTTCCGTTCTCTCGTCAAAAC  
TTAATGTTTATTTAAAATACCCCTCTGAAAAGAAAGAACGACAGGTG  
CTGAAAGCGAGCTTGGCCTCTGTCGTTCTCTGTTGTCC  
CGTGGAAATGAACAATGGAAGTCAACAAAAGCAGAGCTATCGATGATAA  
GCGGTCAAACATGAGAACATTGCGGCCGATAATACGACTCACTATAGGGA  
TCATATTATGGTGTATTAAAGGGAGTGCCATCAATCATGGTGGCAAAA  
CCAATGGCTATAGTGTGCTAATCCGATAAGCAACAGCGTGTCAATTAGT  
GAGGCTTGCAGCGGCTCAAATAGCTCCTCATCAAGTCAGTTATGTAGA  
AGCGCATGGTGCAGGGAAAGCCGTTAGGCACCAATAGAAATTACGGCTC  
TCAGCAAAGCATTAAACAATGTTAGTGCAGCAATTAAATGTGAAAAGTGC  
GCCAATCAATCGTGTATTGGCTCGTAAATCCAATATAGGAAACTG  
TGAATCTGCAGCAGGGAC : TGCCAGTATTAGCAAAGTATTGCTACAAATG  
AAACATGGCAAATAGTGCCTGCATTCAAAGAAACTGAATCCCAA  
TATTGATTTTCAGCAACTCCCTTGTGGTTAACCAAGAAACTGCGCGATT  
GGCAGAGACCGCTGATTGATGGAAAAACAGTGCCGAGAGAGTTGCGGGTGT  
TTTCATTGGGGCAGGTGGTTCAAAT : GC : TTACGTGGTATTGAAGAG

*FIG. 17B (cont'd)*

TATATTGCGAAGATAACGACAAATAACACCAGGGAATCTATAAACCATA  
 GTCTATTATTCCATTATCAGCACGAACGTGCTGAGCAGTTGCGGCAAATTG  
 CCAGTAGATTGCTGGCATTATTGAAAAGAACAGCAAGACAGCGTGGTT  
 ACCCCCCTTAATAGATATTGCTTATACATTGCAGGTAGGACGCGAAGCAAT  
 GGATGAACGCTTGGGTTATTGTGAGTTAACCCGATGAATTAGTCGAA  
 GAACTACGAAGATATCTCAAACACACGATGATATGGAAGAGAGCTTATCG  
 AGGTCAGGTTAATCGATATGAAGACACCTTCTACTATGGCGCTGGAT  
 GGAAGATCTCTTGGGGCTATCCCACCCATTGGGATTAACAAACGAAA  
 AACTGGTCTTAAGTTAATGCCAATTATTGGGATTAAAAGGGGTCTT  
 GTGGATTAAWTTKGGRKРАGWTATASSWTKYTTMCСAАARGRKГWТW  
 KTCCYCSGCRMATKARMKKAYTACCTRCCYTTYGGCRGSMATATTTTA  
 RGWTKKTAMMSWTYRNМCCCTCWTWCCTYTTKTRCCСAGGGNCCAAA  
 TTTATTNGTTNGGGAAATTNGTTAAAAAGAATTGGTTAANC  
 CCACCTNCCNTAAACTTCATTGGGGGNAATGGTTTATTGGNAA  
 CCCATTCCNAAACAAAAANGGCCTTTTTCCATTCCNAAAAAA  
 ACCAAATTGGCCCCTTTTGGGGGGGGAAAAAAACCCNAANGG  
 GGAAAAATTNTTTTAAAAAA

*5B PstC1/E1*

NNNANNTTCCNATTCCCTGGCGGAAATTGGCCAGGGNCCGNAT  
 AACCAAAGGACCCTTTTCNGGCCCTTAAAAACCAATTNCCCCNT  
 TTAATCCCCCGAATAAAAGAACCTTCCAAAAAAAGGGNAANTGAAN  
 TGGGGGNANCNTGGAAATCCAAGCCAAAAAAAGGCCAAYMTCGCC  
 WARAAKRKKCCAWWAATSSGAWAASMСYYCCAGAWARWATTWTKRWA  
 MWRAWCYAGYWMSCAMATCRGRTGTTATGRRSSRGWMYAWWTRA  
 AARYMYTCCAWYKTKTTKSSGRRCAATKATGSSRKWTYYTCAAYMTTGG  
 GACTCMCYYMTCМММWTTGAAAACCМWATTATAKTRTAAGSGGGCC  
 AAATAATCAATGTTGGATATGTTAAMCCGATAAAAAAAAGCCTCAATAA  
 ATTTTNGCCAACAACTAAGACAGCTCTACAATAACATAAAAGCAATA  
 ATGAGTCCCTGTGATTATTCCCATGAAAAAAACAATGGCATTAAATAG  
 ATAGATCTCATACTGAATCGAATATTGCCATTATAGGTATATCAGGGTGT  
 TTTCCGGATGCAAAAATGTTAATGAATTGGAAAATTAAAAATGC  
 TCGTCATAGTGTAAAGAAATCCCTATAACCGGTCTGGGATATTGATA  
 ATTACTTGATACCTTCGCAAACACATGCACAGGAATATGTTAAACAA  
 GGAGCATTAGAAAATCGATCTTGATCCGCTGTTTAATAT  
 TTCTCCGGTГGAAGCAGAGCTATGGATCCAATGAAACGATTTCCTTC  
 AGGAATCCTГGAAGCGATTGA: A: GATGCTGGTTATGATGCATCAA  
 ACT : TAAGTGGAAAACG : T : TGGGGGTATTGCGCTGTGCAAAGGGAGACTAC  
 CATGCCATTATTCAACAGCAGGATAAAACTCGTATCATGACCACACT  
 TATGCCCTGCCAGGTTGCTTATTGAATTG : : TTAGGGCCTGC  
 AGTTCACGTTGATA : C : GGCTTGTCATC : GTCTTGGCAGCAATTGCTT

*FIG. 17B (cont'd)*

ACGCATGTGATGCCCTCATTCTTAGAAATTGTGATGTTGCCATTGCAGGA  
GGTGGAAATATCAACTCAACTCCCAGCCTTGATCAGTTCAAGTCAACT  
TGGTTGTTGTCAAAAGATGGCCGATGTTATGCCTSDATCAACGTGCAA  
ACGGAACGGTATTAGGGGAGGGCGGTASCATCGATTATTTAAAACCTTA  
CAACAAGCGATTGACGATGGTATCAGGTCTACGGATTAATTAGGGTTG  
GGGAATGAATCAARATGGAAAACCAATGGTMTTACTGCTCTAGTGTAA  
AGTCACAAATTCAKTTGGAAACGGATGTTATCAAAAATTATGATWAAT  
CCTGAACATATTACKATGGTSMAGCCATGGAACGGACTAAACTASG  
AGATCCCATTGAGGYTCAGGCATTAMCAGAAGCTTTCASAAATATACTY  
AAAAAACAKGGTMTTGTGCACTAGNGTTCTTRAAAARWAAATATTGGAC  
ATACNTTTTCCCGCTGCTGGRAKTCCTAGATGTTAATMAAGGGTTTG  
TTGTCATTCWCANCATTYACMARGWTTCYTYCRTARTWWTAATTYW  
MAARSTATNAMTTWTTCAWWATTCCATYGTNAAWWACCCYWATTTKKW  
KTAAAAMCAGCYCATWWTTWWYSSSKGTMATTWWNYCCNCTTWTTRW  
WMCCCMYTTGCGRRCSGTTTTCTGCKKKTGTTCRWCAKAGAATCTM  
MMSYCCTTTYTYGCMMMAANMRNNTTAAACMMMTWRCCTTYTTTRGR  
KGGSGYCCCCCNCCNGGGGAANCCCCAANTGGTCCCCNNTTGGG  
GGGGGGGNTTNGNNAANGAAAATTCTTTCATGCCCNANAAAAGG  
TCCTTCCGCAACCTTTAAAAATAANCCNTCCCCNAAAANTTGGG  
NATTGGGANTGGATTAAAAGGCCCTTTACCCCCCGNGTTA  
ATTTAATTCCCCCTTTTGTTCCGGGCC

### 5B PstE1/A3

NNACCAATTTCGAAACCCAAGNCATTTGAAAGGGGTTTGGGGCCCC  
GGGGTTGAAAAAAAAANGGGTTTGGCCCCCCCCNNAGNAANTA  
AAAATGGTAAGGAACNCGCCCCCCACTTGAAACCTCCCCNAAAA  
AAAATAAAAGGCNTTGGAATTTTAACNAAAATNNCGGGGNTGGC  
CNTTAAANAACCCCCCNNTNCAAAAATGCGARRGGKGGYCTCCWR  
RNAYTYYAAWAWGRAMGSGKTAWYTMCCWAKTGRGGGWNTTWTATCAWT  
AAAGGNSSGGGKTYTAWKWTTTAWRAARRGGRAGCTTAGRAAWAWAAW  
ARWCMGTGKKTAAARAGARATTKWWAARRRAACTGGRWTRAAKTWWWW  
RWRTTATWATANAAATRKKWAAKGGWRTATAGAGGGAAAAAATTAAA  
GGATAAAATGAARGAAACCCATCWCCATTATTTCCAAGAGSACCAAAGA  
AATGATAGAAGTTGTTAAATTATGGRTGCGTAAAAGAAATTTCCTCAA  
AWTTTAAWTYCTTGGTTAAAGGATTAAACMCTGRTTGGAAAGCAATT  
ATATGGTAAAGAACMTCAGCTCGTATTAGTTGCCAWGCTATCCTTTG  
CCAAAGAGCGGTTATTGGTTGGATACTGATAAGTTAGTCGACGGTAGTTA  
TYTCAACCCTAGRCAAGAGGGAATWAATACAGATAGTGATAAGTTGATG  
AAAAGCTTATGAATCCTGTTGGACAATCTTTTCCAAAACATGACM  
CCTGATGAAGCTATTAAGTTAATGGAAGAGGAGGTATCATGAAAAAATTA  
ATTAAATTGATTTATGAAAAAGTTTGGAAAATAACTATCAAAATCAGA

FIG. 17B (cont'd)

AGCCTTGTGTTGATTAGTGGATTGAAGGCGAGCAATACTACTATCCTTC  
 ATCCCCCTTATACATGAAAACACGTCAAGTTTTGAAAAAAAATTCACT  
 TCAACTTTCTGGTAGAGAATTTCTTCGGATAGATGCTAACCTAA  
 AAAAAGTGTATTATCTCCTGTAACACATACCTGAAATGGTTATGCTGCAG  
 CAACAAAGGCAATGGCTGGTGAGAAATTCAGCGCAAT : TTAAAAAAAT  
 TGAGTGGCAATATCCAGCTATTGTTCATGAAGAGTCGATAACAGTCATA  
 TTCGTTTTTAAAGATCCAAATACCTGGTTGGATAACAAGTGAGGAGAAA  
 TTTTATGCTATCAAATTACACAATTCAAATAATCAAGAAACA : A : GC  
 GATATTGTTACAACCGGGGTGTAATAGATTATGATCATAAAATAGTGA  
 ATTAAGTCCACTGATATTTTCACTACAAAAGCATATCAGTGAATATT  
 TTCTAGACCCTAAAGAGGATAGTGATTGGGGAAAAGAGCGATAAAAGT  
 AATGAGCCCTATTATCAGAGTATTGAATTGTTACATATTAATTTCAGAA  
 AGAAGCGCTTATAAAATTATCGTTGATCACGTATCAGGATACTATAAC  
 CATCAAGAGTCATTGGTTTACATCCAGATATACTGGAGTTGGCTTACA  
 ATCCTGTAGCTTCTTATGCCTGATATGGCAGACTGGAATCTGAGTT  
 TTCGGGGAGTTGCAGCCCAGTGAGTGGTAGATGCTTTATCAAATNCAT  
 GTCTCGGCTGGTCCAGGGACCTCAAATGGTGGKTTGGGTTACCGGCTT  
 AACARSYTTCCATGGAAGGGTAGGGNTAWATAGSRCRCANTATTGCCY  
 TKGGTGRGGAATRAWRGTWATKCSKGGGGWCGSTAMWWAGGGTTGGG  
 TTYTCAAACCAAWRAAMMSKGTTTYYTGRRKWWTTTTSSMMMMGCC  
 SCNAAATTNGAACCCCCNNNGNTAAANCCCNNGAAATTNNNTTTTT  
 TTTTNCCCCGNNCCCAANCNNAGAAANGAACCTTNCGNGGTTGGG  
 CAATTAAATTAAATTAGGGCAAACCCCCNTTAATNGGAAGGGGGNCCA  
 NTTGGGNGGTTTTTNGGAAAAAGGAAGGGNAAATTGGGNNAAAAGG  
 CCCCCCAAANTNGGTTAAAAGGGGAAAAAAATNAACCGTTAA  
 AAAAATTNNCCCCCAAANT

FIG. 17B (cont'd)

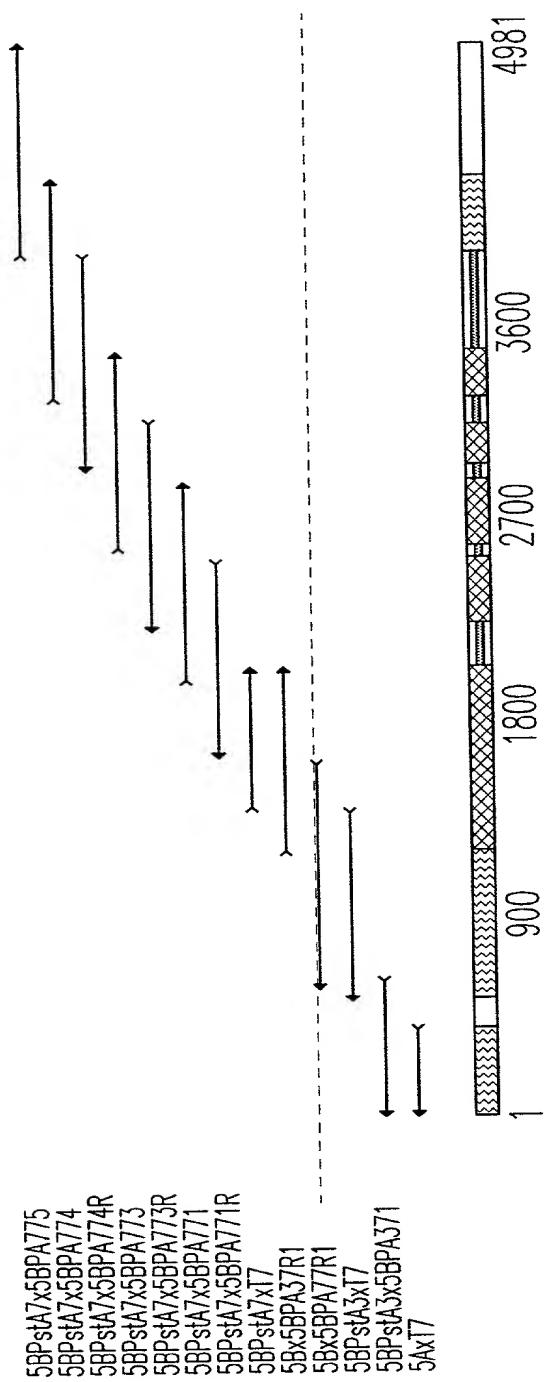


Fig. 18A

*5B PstA7/5A T7 Sequence*

GCACCGTTGGAACGTTATGGCATCGATTGATTGTGATTCAAGGTGAA  
 TCAGGGCGTTGGCGGCTATTTGATGCGCTGCCTAAACACTGTTATTTG  
 AATATCAAACGATAGACGGTCTGGCTTACTTGGTTGAGCAGCACCGC  
 CAGGCATGTAGGGTGTGGACGGGTTAACGGCAACGGTCAAGCTCAAAG  
 AGAGGGTGTACCTCCTACCTCATCAGCGGGTGTGAACCTGTGACAC  
 CGAGACAGAAAGAGGGTACCTATACAGAAAGACATCAAGTGCCGAGAA  
 CACCCAGTACAGACGAGCCTATAGCCATTATTGGTCTGAGTGGACATTA  
 TCCGCAAGCGAATAGTTGGATGCGTATTGGAAAATTGAAGGCAGGAA  
 AAGATTGTATTCTGAAATTCCCGATGACCGTTGGTCGCTAGACGGTTT  
 TTCCATGAAGATGTTGAAGAAGCGATTGCGCAAGGGAAAAGTTACAGTAA  
 ATGGGGCGGTTTTAGAGGGATTGCTGATTGACCCCTCTCTTTTAA  
 ACCTATCGCCCGAGAGGTGATGACGATCGATCCACAGGAGCGTTGTT  
 TTACAGAGTGCCTGGGAAGCTGTGGAGGATGCCGTTATCGCTGCTCAG  
 CTTGCTTCGCACTTAACAAGCGTGTGGGTATTTGCGGGTATTACCAA  
 GACGGTTTGATTTTATGGAATAACAATCGGATCSAGCTSBTYT : YCGC  
 WT : ATACTTCCT : TTACKCCAGGTTAAAARGCCWMGWTCAAGCT : TKT  
 TSGGGTTTTTAABTHHGCGGGKGGGTKTTTGVSCCVWAT : AGCA : CSG  
 DCGGTTTTKMATTTTTAWTGGRAA : AC : CAATCGGGATCAAC : TCT  
 TT : TCCGCTTATACTTCCTTAGCTCAGTGG : CT : AATCGTGTGTCTT  
 ATTTTTGGGTTTACAAGGCCAAGTC : TGT : CTATTGATACCATGTGCT  
 CCTCATCTTGACGGCAATACATGAAGCCTGCGAGCATCTGCATGCCAA  
 CGATGTGAAGTGGCTATTGCGGGGGAGTGAATCTTATTG : CACCCTT  
 CAACCTATATTAGATTGTACTTTACGGATGCTTCCAAAGAGGGCCTG  
 TGCAAAAGCTTGGTTATGGTGGTAATGGTTGTACCGGGAG : AGGGGG  
 TTGGCGCTGTGTTGAAACCTTG : TCTAGAGCCATTCAAGGATCAGG  
 ATAGTATATATGCCATTATTAGAGGGAGTTGTGTTAATCATGGTGGCAA  
 ACCAATGGTTACTGTGCTAATCCACATTCTCA : AGCGATCTTA : TT  
 CGTGAAGCTTGGA : TAAAGCTCA : G : GTTAA : TGCCCGTAT : GGTCAGT  
 TATATAGAAGCC : CATGGTACA : GGTACAGAGTTGGGTGACC : CAATAGA  
 GGTAAAGAGGCTAACGCAAGCCT : TCAACAAGATACTGATGATGTTGGT  
 TTTGTGTAT : TGG : GTTCAGTTAAATCTA : ATATTGGTCATC : TGGAAG  
 CTGCCGCTGGTATCGCTGGCTGAGCA : AAGTTATTCTGCAGATGAAGTA  
 TGAAAAAAATAGTGGCAAGCCTACATGCAGAAAGACTGAATGCCAATATAA  
 ATTTGAACAAACTCCTTTGTTGTTCAAGCAATCACTTAATGAATGGGAA  
 AGACCAAACCTCATGTTAATGGAAAAATCAAAGAATATCCTAGGACCGC  
 GGGGATCTCTCTTGGTGCAGGAGGGACGAATGCACATATAATAATAC  
 AGGAGTATATTCCAGAAGTCAGTCAGACACGACAATCAGAGGTCAAGGAAT  
 AAACCAGCTACCCGGTGGCCATTCTGCTATCTGCGCATACTCCGCTCA  
 GTTACTGAAGATGGCCGAGGCACTTTACTATTATTCTGTAACCATAGTGA  
 ATAATATGGACTCATCCTATTGGCAGGGATGAGATGACTCACTGGTA

AATGTAGCCTATACATTACAGGTTGGACGTGAAGCTATGCAGGAACGCCT  
 GGGGTTGTTGAAATTCCCTGAGTGATATTGAAGTGAAACTACAAAAAT  
 TTATTGATAAGGAAAATGATATTGAAGACTTTATCGGGATCAAATCAAG  
 ACTAAAAAAAGAAATCTCAGCTCTATTAAATTGGATGAAGATTGCAGGA  
 AGTGATTAACAAATGGATGCGACAAAAAAACTATCCAGGCTTGTAC  
 TTTGGGTTAAGGGAGTTCACTGTGATTGAACTTCTGTATCAACATATG  
 CGAACCAAACCTTATCGGTTACATTACCAACGTACCCATTGCTTATAA  
 TCGATATTGGATTGATGATAATAATAAAAAATCAATCGACTGTAGTTGAA  
 AAACCAACACTATTAAAGAGAGAAAAGAGCAAGTTAGATTAGAGCCG  
 CTTGATTTATGGAAAGGAAAAACTTAATGTCCATGAAAAAAAGCCATT  
 TCATTGTTCTTATCAACTCAATCAGAGGCCTGGTCCGGGCGAACACTC  
 AGACATCCAGTGGTAAACAAAGACGATCTTATGTACAGGTGCTAAACAA  
 GACGATATATTAAGGGATCTTAAATCAGCGCTGCCTACAGCTGTTGAAGG  
 TATGATACCAACATTAAATCGAACTGGTGTATGACAGAAAGCTTAAGCT  
 CCTACTCAGAACGATTGCAAACATGCTGGTATGTGTGGTGGAGAAGTA  
 TTGGACTTGGGGTGTGCCTATGGAATTGCAACGATTGCAAGCGTTGGAGCG  
 AGGGGCTCAAGTATTAGCCGTAGATATGGAGGCACAGCATCTGGAAATAT  
 TATCAGACCGTATTGGGATGAAGTGAAGTCGCGTTATCGACACAAAGTA  
 GGCAAGTTGCTGGATCTCATTGATCAAGAACGTTTGCTGCGATCCA  
 TGCGAGCCGAGTGCTACACTTTAAACCCACAGGATTCCAGCAAGCAT  
 TACAAAAAAATGTATGGCTGGTAAAACCCGGAGGAAAATTATTATTGTG  
 ACGGATACCCCTTATATGGGTATTGGCGAGCAAAGCAGGGTTATGA  
 AACTCGAAAGCAGCAGGGGATTATGCCAGGCTACATAGATAATGTTG  
 GTTCTCACTTAAACTAAAGAGATAGAAGGGCCCAACTCTGATCAAC  
 CCGATGGACCCGGAAATACTGCATCGTAATGCAAAAAATTGGTTTCA  
 TGTAGAAGAGACTGTTTTTGCAAGGAGAAGCCTTGCACTAAATAATA  
 GTTAGAAAAATCAGGTAGAGAGCATGTTGGTATAATAGCATTGAAGCCG  
 GAATTGGAAGATTCCGACAGGCTTGAGAAATCGCTATTGCCAGTACGGAA  
 AACTGAAACGGAGAATAAGGAAATTAGCCTACTGCAAATACAGACAATGC  
 TTAGGGAGAGTCTTGAATTGATAGAGCCGGTATGTTGGAT  
 GAGTTAAAACCTTTACAGATTAGGGTGGACTCGATAATGGAGTCAC  
 CTGGATACGAAAATCAATAGTCACTATGGATTATCTATGACTGCGACGA  
 AAGTATATGATTACCCAAATATTATTGAGTTGGCAGAGTTTTAAGAAAA  
 CAAATTATTCGAATGATGAAAAGCAGCATCAACCCTATATCAACAAAT  
 ATTTCCCACTTCATTGGATGAATTATTGAAAAAAATACAAGAAGGTACTT  
 TAGGGATTGAAGAAGCCGACCAATTAAATTGATGAACCTACCTGATTACCAT  
 CTAGATATGGAACTCCATGAGTTGTTATAAGGAAAGCGAGGTATTTG  
 TGTCACACCGATGGATGGTAAAACCATTGGCTGAAAAGAATTAGCTC  
 AAATCGGCGCAGCTTGCTGCGTCCGAGTGATTGACTTGTATGGTGAA  
 CTCAACTATGCTGTACGGATTCCCTACATAAGTAGGTAAAAATGGA  
 AACAAATTAGTGTAAACCAATTAGAGACAATTGAAAAGTTGTAGAAC  
 AAGCAGTTAGCACGCATGAGCCAATTAAAGTAACGCGCAGAGCCAGTGAG

FIG. 18B (cont'd)

GCTTCGTCGTGATAAGTGCCGATGATTGGGAGCAAGAACAGGAAAGCCT  
 TTATATTTTCAGAATAGTGATTGATGCAACAAATTGCAGATCGCTTG  
 GTACGCATACTCAGGGCAAGGGATAACAAACCAACGGATAATGAGTTGAAT  
 GAAATCACTGGTGCTTGAAGGCCATACCTGGAAAAGCTGGAAAAGCTTT  
 GCGAGCAAGATAAGCGTTACACAAGGCATTATGCAAACACTCAAAGAA  
 ATGCTTCACTCGGAAGATCTAACCTCCGGATTAGTAAACCTGAGCCGCT  
 TAAGCATAACTTATCTGGCTTATGGTCTCGGCCATTGCAAAAAGACC  
 GACTGATATATCGCTTATTTCGCTATCGGTGGTCACTACGATCAACAT  
 TTAGTTGCCATAACGCCATAACAAGGGAAAATATGAAGCGCAGCGGAATC  
 TTTTCCCTGTGGTTACGCTTATAAGGTTTTATTCAATTAGACTC  
 CCTCTGTGTTACTGCAYTGTGGTAGCCAGTCCAGTCCACGTTTTTG  
 KGGGCSRWTTCATATGTATATTTTAACTCAATGGATAATGTTTATA  
 MCCAMCCMCCATTGTATATTTTAACTCAATGGATAATGTTTATA  
 GCTAACTGTGAAGCTTCGATTGCCTGATTGAACTCACGATCATTTCTC  
 TGATTTTCATAAAAGGCAGTAGGTGAAATGAAGCTGGTTCTGATTTT  
 TATGTACAGCTTATTCTGAATCTAATTAAAACCTTCATATATTGATAT  
 GCTTGCTTTGATTTATCAATTCTTCCAGTAATAATTCTGTCGCAAAC  
 TAGCCATTAGAAATAATCTAATTATCTAAGTGCTCAACAACCGTAT  
 TTGTCAGACAAAATGACGAGCAGAAAATCWTAGACTGTATATTCTTAAA  
 TACWTAGAGGACAATTWTCMCACAAAAGATWTCTGCCTCCACTGAGGCT  
 ATTTCTTYTTGKAATCTTATCCCTAATATTTCAGCTTAGTGACCA  
 ATAATTATATCATWMAGGTACTCTGTAAGCCGATAATACCTTGCTTA  
 TATCCAATAATTGGGACCAAAAAAGTGCAAAAGCGTGGCGCAGATCG  
 AGAAATTATTCCGTTGYGGAATAGACTATTGCATCAATTACTGCTCAA  
 WGCGCTAAAATTCTGCAAATTGGTAAGGGCTTACGTGTTGTCTT  
 GTACAWAGCTGTTCTATTCACTCAGCAGGAGACAAACATGGATTAGCAAGTATG  
 GGTGTAGTTACTKAAAGAAATCATTGGCAGTATAGTCAACTCATTGA  
 AAGTCCTATATTAACGTCGCCAAAGTTAAATAGTTTACGATGAGATG  
 TAGGCATTGTGATAATGTGCTGCACATCATCACAATCATTCACTCAGCATATC  
 CATAAACCTCTCGAACATCTAACATCATCTCCCGTCACTGGAGTTGTG  
 TTTGAGGAATAATTGGATTTCGTCGACATCRRACTGAAGCTTTCAAAG  
 GCTTCAGATAACGCTTGCTTGGCCTTAAATATTCACTGAGGAAACCAG  
 TACGCTGATCTTACCGTTTTGCTTCAATATCGGTGACATCCACATT  
 CCATCATTAAATGTCTCCAATACGACTCTCGTCATTCCAGTGAACAA  
 AGGATTGCACAATGATTAACATATGGCTAACACTGCCTGGTACCAAT  
 CTTGCTTTGGTTGGTAAACAAATACGCACATCACCGAAGGTGCGAT

FIG. 18B (cont'd)

51/110

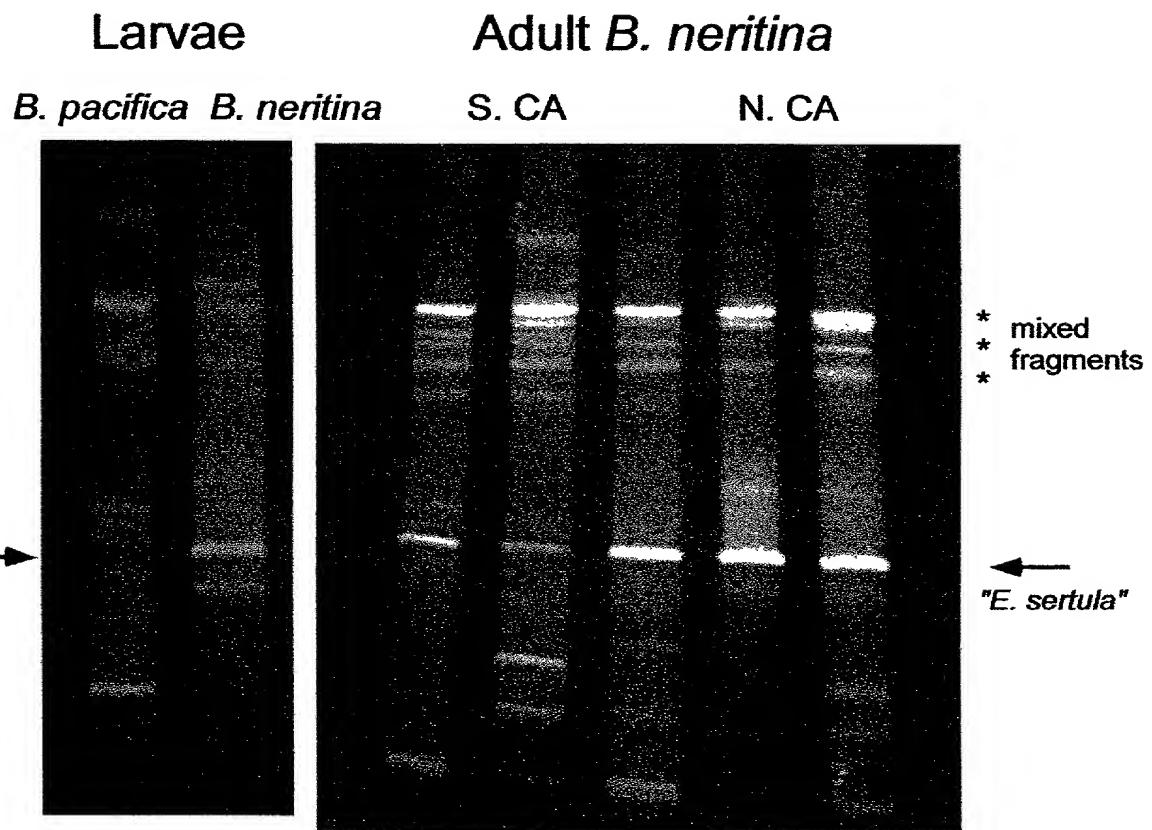


FIG. 19

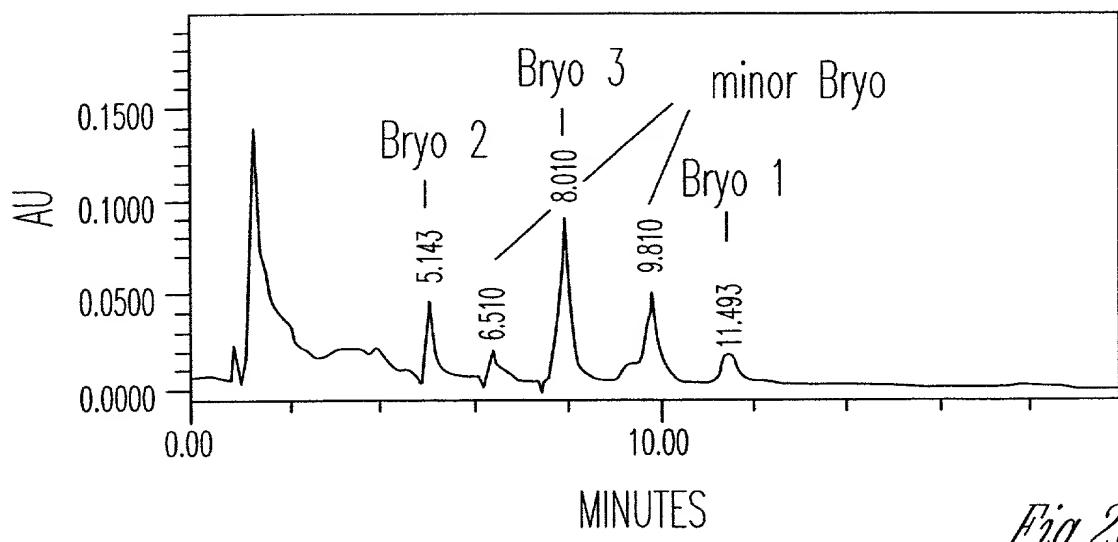


Fig. 20A

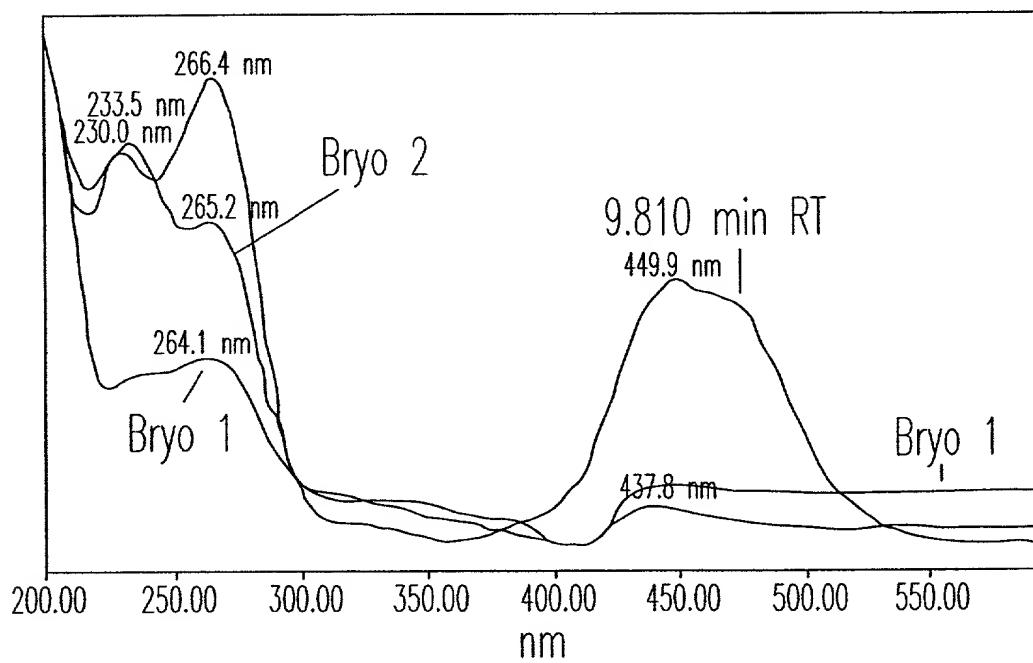


Fig. 20B

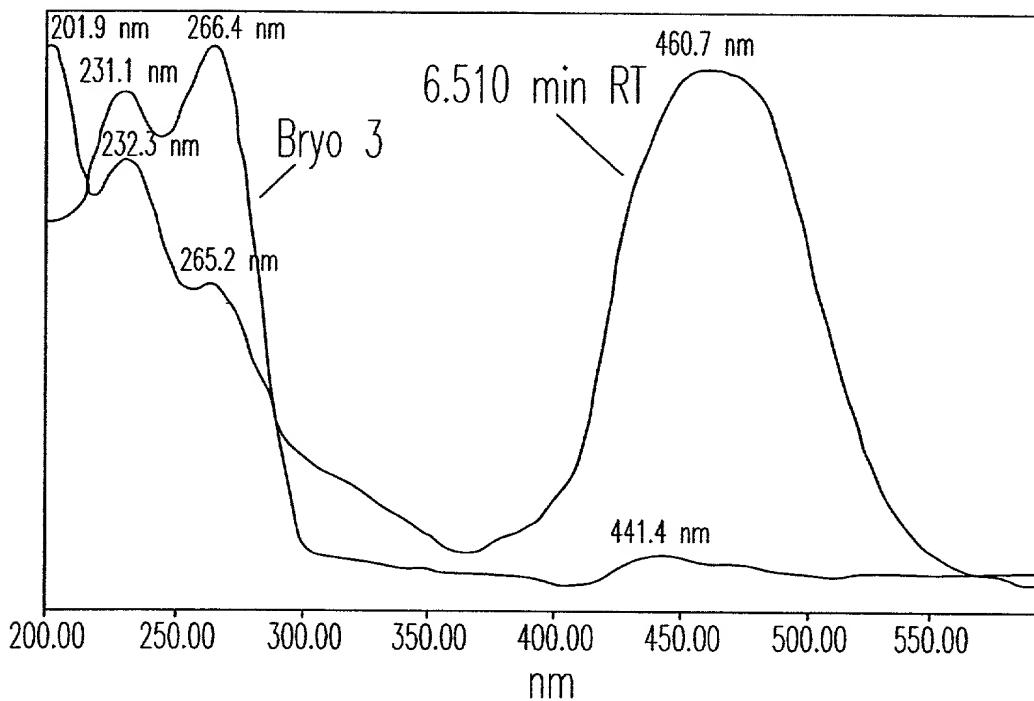


Fig.20C

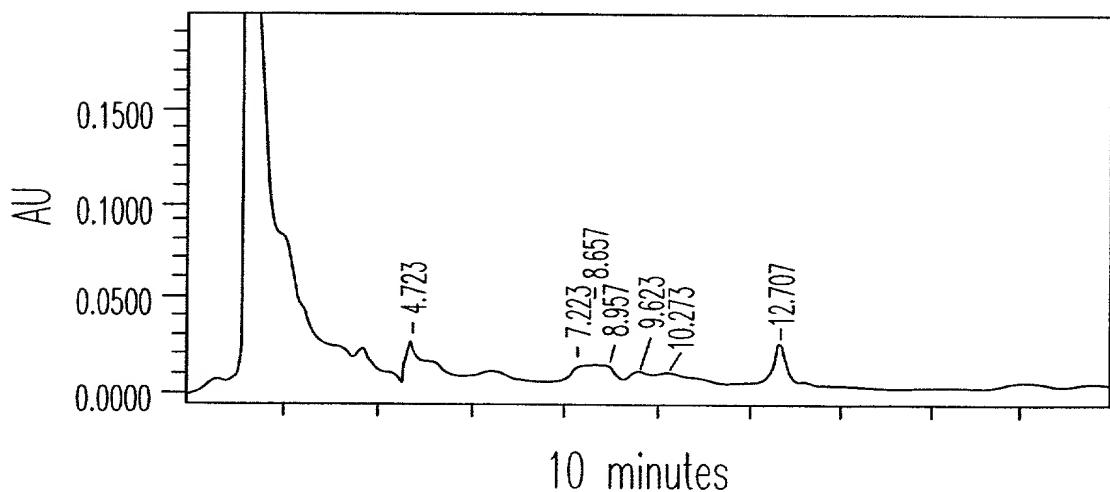


Fig.20D

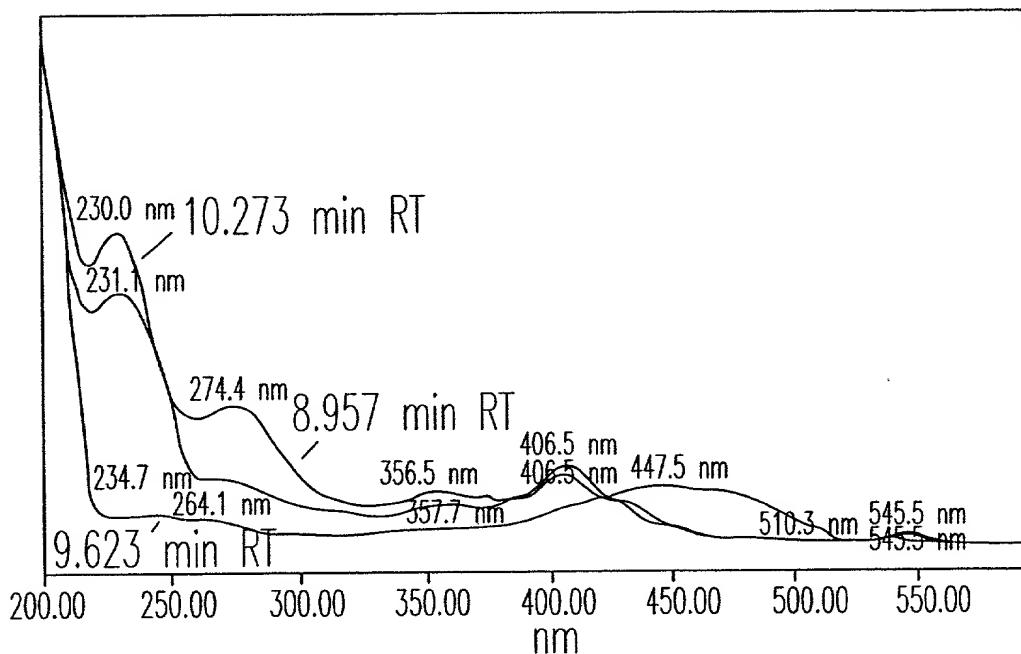


Fig. 20E'

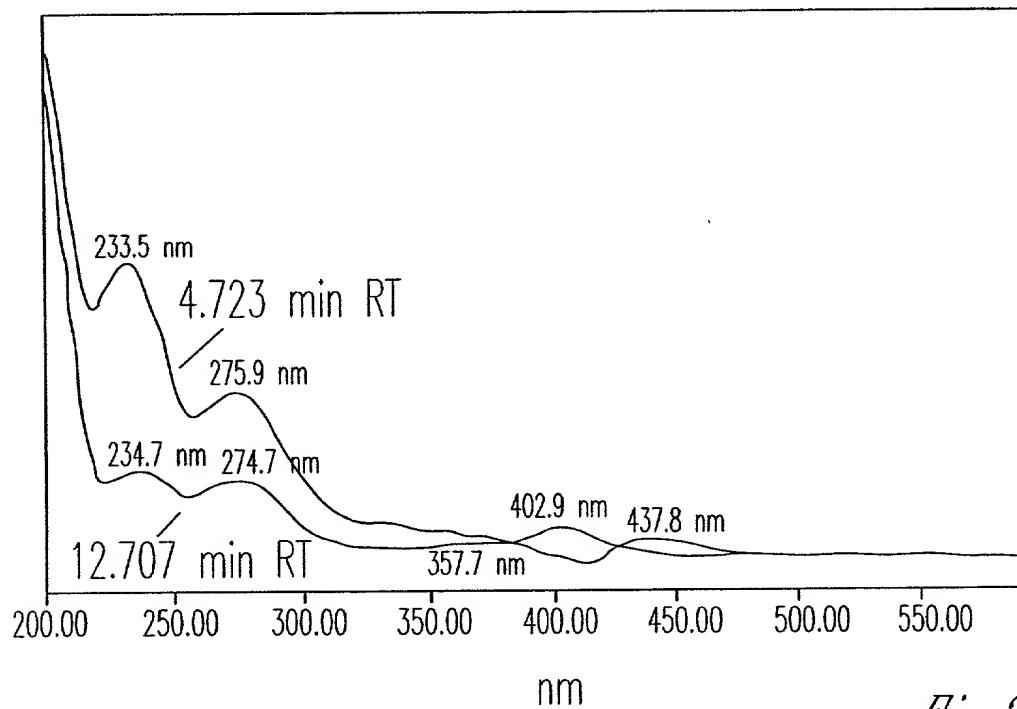


Fig. 20F'

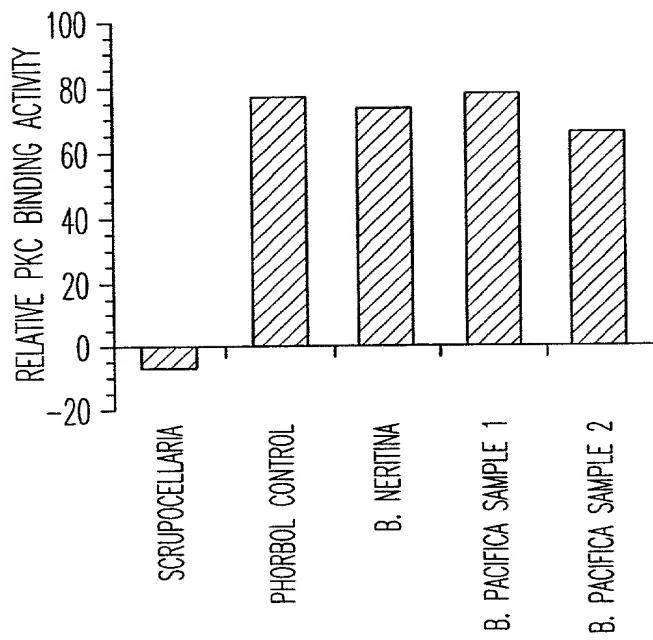


Fig. 21

aaattgggtg atccgataga agtcgagaca ttggcagaat cgttgcgagt ctatacggac 60  
 aaggcgtcatt actgtgtctt ggggtcggtt aaaaagtaata ttggtcatt ggggttaggt 120  
 gctgggatag cggcggtgac caaagtatttgc ttgtctttgc agcatcgcat gttaccacg 180  
 acgattcatt gtgaggatgt aaacccacag attgcggtgg aaggtagccc cttttatatc 240  
 aatacggat taaaggcttg gcagttctggt gacggatatac cacgacgggc tggtgtcagt 300  
 tctttttggtg tcagt 315

FIG. 22A

aaattgggtg atccgataga agtcgagaca ttggcagaat cgttgcgagt ctatacggac 60 SEQID NO:9  
 aaggcgtcatt actgtgtctt ggggtcggtt aaaaagtaata ttggtcatt ggggttaggt 120  
 gctgggatag cggcggtgac caaagtatttgc ttgtctttgc agcatcgcat gttaccacg 180  
 acgattcatt gtgaggatgt aaacccacag attgcggtgg aaggtagccc cttttatatc 240  
 aatacggat taaaggcttg gcagttctggt gacggatatac cacgacgggc tggtgtcagt 300 SEQID NO:11  
 tctttttggtg tcagt 315  
 acatcaccat tacaaaaatc tattttaccc cagaacgggt tgtttattgt tccactatct 420  
 gcaaaaaatg atgaatgttt aatgtcttgt gtcgaaacgac tgtttatttt tctaaaaaggc 480  
 aggcaatccg atacatataa aaaatattcc ttaagtgata cagctccat atgttagat 540  
 ttagcatata ccctccaggc cagtagggaa gcgatgacaa aacgaggttgc ctttgtatgtg 600  
 aaaaacaaca tagagtttaat gggaaaaatata aatgcattt tagaaaaaaca aaatactata 660  
 aaaaagcaagta atataaaagg ttgttactac tcttcgacta aaacatcgag tccatttgc 720  
 aatgaatcga ctgatc 736

FIG. 22B

cgatttagtg atccaatttg aattggcagg ctctcgaaagg cgtttaggaa gggacaccaa 60 SEQID NO:13  
 cggaaacagt ttgtcggtt cggttcgtt aaatcaaata ttgttcattt ggtatgttgct 120  
 gctggagtcg ttggtctgtt caagacaggca ttgtcgctgc agcacccgtt gttggctccc 180  
 acgatcaact acggaaaggcc caatcgggaa atcaatttg aacaatcacc ctttcattgtg 240  
 attgatgaaac tcaacggagg tgcgggttcaa ggtggaccac ttctggctgg tgttagctcg 300  
 ttgtggaaatttg gt 312

FIG. 22C

caatttggcg accctatttg actggcaagg ctggccgatg tgtagatagatg tgataactgg 60 SEQID NO:15  
 cggaaaaaca cctgtggcct cggctcggtt aaaaggcaata ttggccatata ctctggggcc 120  
 tctgggttgg ctggataca caagggtgtt ttatcgctt agcatacgaca atttagtagcg 180  
 agccctgcatt ttaataggcgc caatcaccac tttagtttca aacagtgcgc ttttatgtc 240  
 aataccggc taaggccctg ggatcaaggca gaggggacttag aagaaaaggccg ccggccggct 300  
 gcggtcagg tttttggtgtt cagt 324

FIG. 22D

gaggatggag atccaatgg aattgacggct gcaggctggcgc tttttggacyt aggacgaaat 60 SEQID NO:17  
 cggaaaaatc gtttgcgtgtt cggatcgtt aaaggcaata tttagtccatc ggaaggcggcc 120  
 ggggggtattt ctggactgtt caaaggcaata ctggcaatgc agcatggcggt gattccacaa 180  
 caattacact gcaaagaacc gaggccctcat atccctggaa aacgtctgc tctcgatttg 240  
 gtacaaggac agactgtctg gcccggaaatg gaaggaggaa tcggccgtgtt aacaggcgtcg 300  
 gatttagcg 308

FIG. 22E

caacttggcg atgaaataga agttcgcgt ctgagtaaag tttacggaga ttcacagtcc 60 SEQID NO:19  
 acgacatacc ttgggtgtgt aaaaagcaac ataggatcatg ccaacgcggc agcggcatt 120  
 gctggttta taaaacacgt gctgtcttt tacatggca aaattgcacc caatgcaggc 180  
 aataccggc ccaatggcgt ttggaaacctt gacgcgtttc atttgcatt accaaaaact 240  
 ttgtttacat ggcggaaatg tttatgttcgaa cggcggcggaa tcaatctcaat ggttttttgtt 300

FIG. 22F

gccttgggtg atccatttga atttggcgca atcaaggctg tttatggcc tggtcggctc 60 SEQID NO:21  
 tctccgtgg tgcgtggc acttaatcg aacatcgcc atttggcc gactgcagg 120  
 gtgtcgttc tgatattggc agtttttgtt cttaacatg gctgtggctc ggccaaatttg 180  
 cactgtcaca aattgaatcc gcttctggat atcgacggc tcaatgtttt gttcccgccag 240  
 tctgtggacc ctttgcacag ctcttgcagg ctacttggcg ggtatcaggat cgttccgggtt 300  
 tggat 304

FIG. 22G

acttgggtat ccctattttag gtgggggttc ttacagaatc atttcgatcc ctatcagaa 60 SEQID NO:23  
 aaaaaggact actgtgcctc gggatcggtt aaaaaggcaata tcgggcattt tttaaccggc 120  
 gccggaggat ctggaggatg caaagtgtt caatgtttga aacataaga acttccaccc 180  
 tcctgtcatc tggatggat caatggat atcaacccat aggacatgtcc attttatatc 240  
 aatacggcat taatggaaatg gaaatgtatcg gaaatggagg ctccggaggc cgccggggc 300  
 tcgttttgtt caggc 314

FIG. 22H

ccactcgcc acccaatcga gatggcagg ttaaaaacagg cttttggac tcaaaaagaaa 60 SEQID NO:25  
aaatactgtg cgatagggtc ggtggaggc aacattggtc atgcccatac ggcggctggc 120  
gtcgctggtc tcatcaaggac ggtgatggca ctcaaggccg gtcagatacc gccctaggctt 180  
cactttgaga ccccaatcc gcagatcgat ttgcgcgaca gtcctttta tgtaaataaca 240  
accttggaaag attggaaacaa caaacgggtt ccggcgccggc cgggcgtgag ttcgtttggc 300  
atcggt 306

FIG. 22I

gtggtcggag atccgattga ggtcgatggaa ctgacgaaag cctatcaagg ccaacactcag 60 SEQID NO:27  
gaacgtcaat actggggact gggttcggtg aagacgaaata ttggccatac ggactcggtt 120  
gctggcatgt ctggacttct caagatcgtc atggcgatgt aagcatcgta actggccggcg 180  
agcttgaatt ttgaaacacc aaatccagac ctggatctgg aaaaatagtcc gttcttcatac 240  
cagacgaaagc tggaaaggatgtg gggaaatgtgt gggccctcgatc gtggccggcgat ggttcgttt 300  
ggtttgggt 309

FIG. 22J

gatggaaactc attaccaccc aaaaaaaagt ccgtttttc aacgggttg atttaattaa 60 SEQID NO:29  
 ccagctaactc aacgaaacaac aaaaggcagca aacgggcaaa ctcatcagag ccttatttgc 120  
 ggatggatgtt ttaagtatgt atgaaactcgg ttatccaa ttccctaaat ccggggggc 180  
 gtgtgtcttc caccctcatca gtaaacggta tgaaaggacc tggtgtgtt agtattatca tcggccacaa 240  
 tctggctttt acggatcattt gggaaatggaa acagtgtgtt tggtgtgc aagatgacca cccgtttatt 300  
 gatcgatc acggatcattt gttcaaatcat cggaaaccggat cggaaaccggat tggtgtcgat atcggtttaa 360  
 gcaaggatcag aacagacat gaaagttagct ttcaaccggat ggacagtgtt agatgcaaaac 420  
 cccgggtcag cttaaagtgc aatttgaaaa ccaatgtgat aatttggtt aagatcaata 480  
 aaaaataat aaaaataat ttttttattt gttatgtatg attatgtatg tccacgtttaa aaaaataact ataaatatg 540  
 aaaaataat ttttttattt caacttataa ggttttgc gttgttgggg aattttttgt gagttatcga 600  
 gatatttga aggcttaca ggtatggaaaa attatgtttt gttgttgggg aattttttgtt gagttatcga 660  
 aaaaaaaa aagataaaaaa atcaaaaaacgg cgttttaatc atgatcgatgaa attaaatcga 720  
 tcgatgaaata ttacggccaa aatagtgaat aatttacggat tagtattttt ggggggtcat 780  
 ttatttgaag aactccgtct gaggtaatgg aaggtaatgg aacctaacc accctaacc taatgaaagt 840  
 agcattcagg tcaaggcattc cgccattatc actatccctt ttttccgggc ttgttaatggat ctttaccgata ctttgggtgtt acaagggtta 900  
 tatccatcac taaccgactt acacgtgggt ccacgtgggtt ccacaaatggat ctttgggtgtt acaagggtta 960  
 ggtgaacaca atgggggc atgctgccta ttttgggtgtt ccacaaatggat ctttgggtgtt acaagggtta 1020  
 atggggggc ttgaggatgc ctgttagctt ccattgggtt ccacaaatggat ctttgggtgtt acaagggtta 1080  
 gacttattt ttgaggatgc ttgaggatgc ttgaggatgc ttgaggatgc ttgaggatgc ttgaggatgc 1140  
 ttgtcacggg gaaaattatc tcacaacgtt catatcttgc tacaacggc gacagggtggc 1200  
 ttgtgtttga tggacttca gttggcggtt ttaaaggcgt ttggatgttta tggggccccc 1260  
 agccgagaag acaagcttgc actccctcaa cagtgggcac tgccctacgt ctccattat 1320  
 aagacgtgca atattgtatgaa ggaggattcaa cgcgtcagtgt gtcatcgagg ttgtcgatgtc 1380  
 gtcttaataa tgctccagg agggcatata caacaaggggc tgaatagtttt agccaaaggaa 1440  
 gggccgttattt tggaaactgtc gatggcatggaa ttgttaacga acgaaacctgt cagtctgtcg 1500  
 tctctgtgtt ttaatcaatc cgttcaaaacc atcaatttac tgggttactt caataaagggt 1560  
 gatgtatggct ttatcgggtc ttatcgggtt ccaatgggtt cttggatgttgc atcagggtat 1620  
 tttagtgcattaa ccgtgtcggc tattttatccg ttggatcaga tcggatcaga ttggatcaga 1680

FIG. 22K (cont'd)

gctatact tgcaagtgg tcgcgaggca atggacaaac ggataaggttt tattgtcaaac 3420  
 accaaagcaag cactcgtggaa aaaggctaaat gctttcttag agaaaggaaaa gactataaca 3480  
 gactgttacc actattttt aatgtttttt tggatagtgtac aacccgttcaaa cagaatattt cctgttagac 3540  
 gaagatgaca aaggattaaat aacacgctgg aataggcttcaaa gtcataatca caaatatca 3600  
 gaaggcctgga cgcataatcgac tggacgctac tctataccca ctcataacc 3660  
 cctcgtcga ttggccctggcc cagttatccc ttggccagg accgttactg gctaccaggaa 3720  
 aaccacgct ataaacggcggc taatcatccg gtatccaaac atcaaacaac cactcagaat 3780  
 cactcacgct ttggccatttga tacggatcac gatgtcggtt ccgagatcat gcaaaaagaca 3840  
 catcaaacgg aactggaaaca atggttttaa aacactgttgt ttgttcaattt gcaacatatg 3900  
 ggttattttc aacatcgtgt ctgttggaca gcgaccgctc tacgttcaagg tgaggccatc 3960  
 gtgtataat atgtatcgctg gtggcatgg tggatggcggat ttttttaagg ttgttacaggaa tgcgggttat 4020  
 ctgtgaatggaa aagacgatgg cgttagccggcc gcacaggcat 4080  
 gcatgggtggaa gcccgtggaa caggaggat aaggattttc aagatgtatcc 4140  
 acgtttagcga tattgtttaa cgattgttta caggcattac cagggtgtt aagtgggttag 4200  
 caatttaataa cggatattat ttcccataat ggttcgtatgg agaaaatggg 4260  
 aaaaataataa ggtatggcaga ttattgttaat cagtgtgtt gaggactgtt cgtccagttt 4320  
 atgtgaagcac gtctgtcaag agatggcaat gcgaggatac ggattatcgaa aattggggcc 4380  
 ggtacgggg gaccaccggc gatagtgtcg ccaatgttac aagccatatac ggtatcatatc 4440  
 gatacgttatt ttatcacggaa ttgtttccaaa gccttttttgc tgcatggaca ggaacactac 4500  
 ggcgaaacaaat acccctatct gatgttattgc ctctgttaata ttgaaacaggaa cttagtggct 4560  
 caaggaatca gcggttggta ttatgtatatt gcgatcgat ccaatgttac aatggccacg 4620  
 cggaaatatac acgaaacggt caggccatgtg aggaggcat tggggccaa cggttttatgt 4680  
 attttaaatg agtttagc aaaaaggcggtttttcgatggatgg ttttgcgttgg tttgtatgtat 4740  
 ggttggcct tatctggatgg cgtatccctg gaaaggccagg gtttatccct 4800  
 aaggcgtggc aaggcggtact ggaggcgctcg ggttttggatg acgtggaaatt tccgctccat 4860  
 gacgctcggtt agttgggtca acaaataatc ctggcaacca acggccatgc gaaagggtgt 4920  
 agcgatctgtt cgacatcggtt gattgtatcat gcccggatc cgccggatc 4980  
 agcatggatg agagaggatgg ccatgtatggcc atgtatggaaagg catcggttcaaa acagtgttca 5040

FIG. 22K (cont'd)